Science WONDER Stories

October
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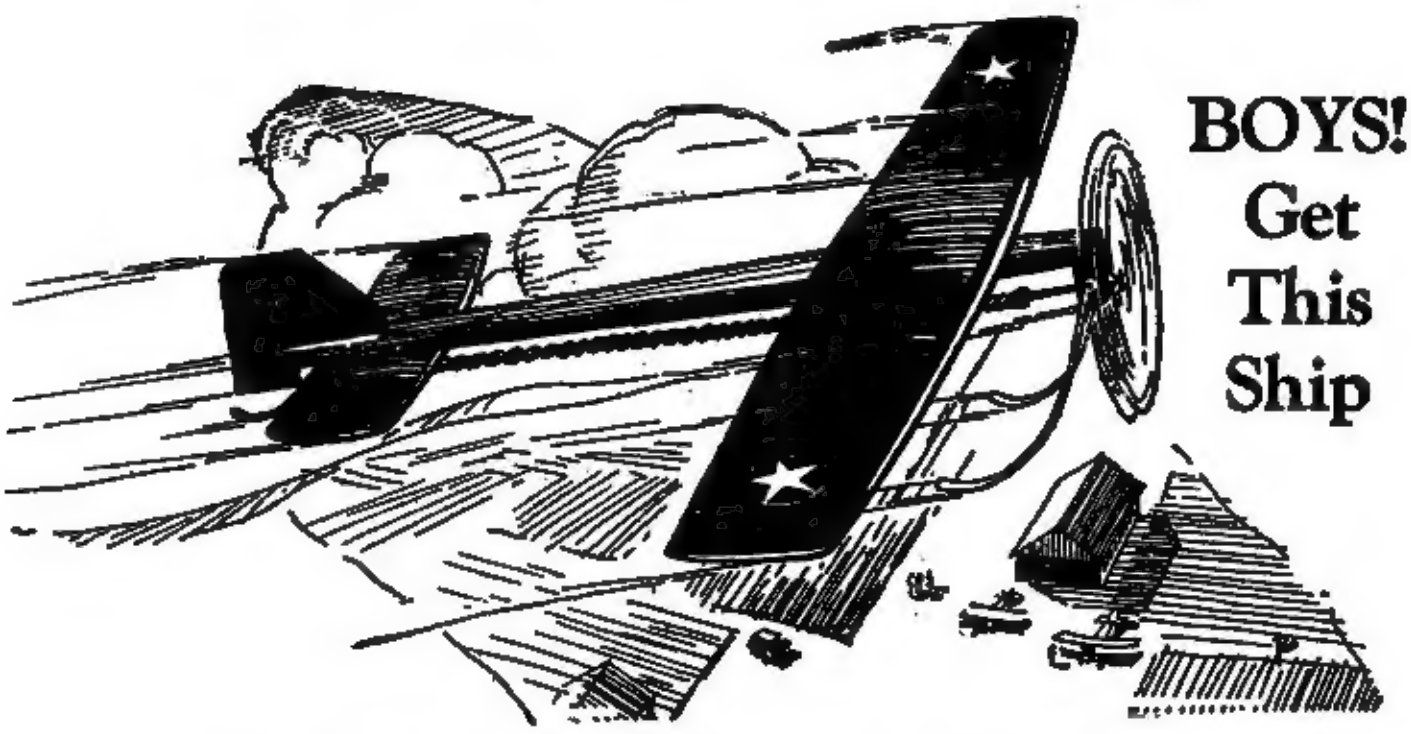

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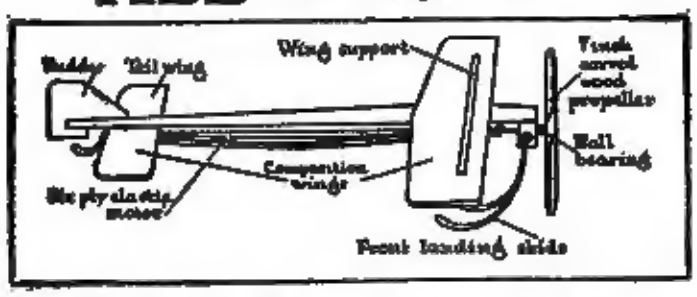

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Vol. 1, No. 5

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Table of Contents
October

THE METAL WORLD
By Ed Earl Repp 391

THE ANCIENT BRAIN
By A. G. Stangland 400

THE HUMAN TERMITES
(A Story in Three Parts) (Part 2)
By David H. Keller, M.D. 410

INTO THE SUBCONSCIOUS
By Ray Avery Myers 426

EROS TO EARTH
By Walter Kateley 436

IN TWO WORLDS
By Edward E. Chappelow 448

WHAT IS YOUR SCIENCE KNOWLEDGE?
Science Questionnaire 447

SCIENCE NEWS OF THE MONTH ... 460

SCIENCE QUESTIONS AND
ANSWERS 464

THE READER SPEAKS
Letters From Our Readers 467

ON THE COVER

this month is illustrated Ray Avery Myer's *"Into the Subconscious."* Here we have a graphic as well as vivid picturization by our inimitable artist Paul, of what happens when scientists of the future will make it possible for us to get a sort of television picturization of our sub-conscious memories.

NEXT MONTH

THE SPACE DWELLERS, by Raymond Gallun. Interplanetarian stories seem to be particularly attractive to our readers. "The Space Dwellers" is a story of interplanetary travel plus. The action is so rapid that it takes your breath away; adventure and excitement fairly tumbling over each other. The science in this story is more daring than many similar ones, and the entire breadth of it is tremendous and will open new vistas for your mind, and we are sure set new standards in interplanetarian stories. Don't miss it.

THE PHANTOM TELEVIEW, by Bob Olsen. Television is coming rapidly to the front. It is slowly emerging out of the laboratories, and even now several corporations are planning to put television sets on the market to be placed in homes of radio fans. Of course, the possibilities of television have only been touched. Some of the great wonders of this new branch of science which are still to come are dealt with in this unforgetable story. We get a brand new angle in a brand new setting with a lot of excitement thrown in for a good measure, and plenty of mystery that will keep you guessing.

THE GOLD TRIUMVIRATE, by Walter Kateley. Transmutation, the dream of the alchemists, has been partly solved in the laboratories of our present day scientists. It has already been possible on a small scale to transmute one element into another. Indeed, radium has shown us the way, because this precious metal after several thousand years is slowly turned into lead. But the present story deals not only in transmutation, but gives us some entirely new angles of physics and what may happen when, in the world we know, science advances a few more steps than it has done so far. A corking story all the way through.

THE HUMAN TERMITES, by Dr. David H. Keller. You will await breathlessly the concluding chapters of this epic of science fiction. The biggest surprises are as yet to come. Dr. Keller has worked out an astounding O. Henry-like ending that fairly takes your breath away in daring, and yet it is all simplicity and logic personified.

AND OTHERS

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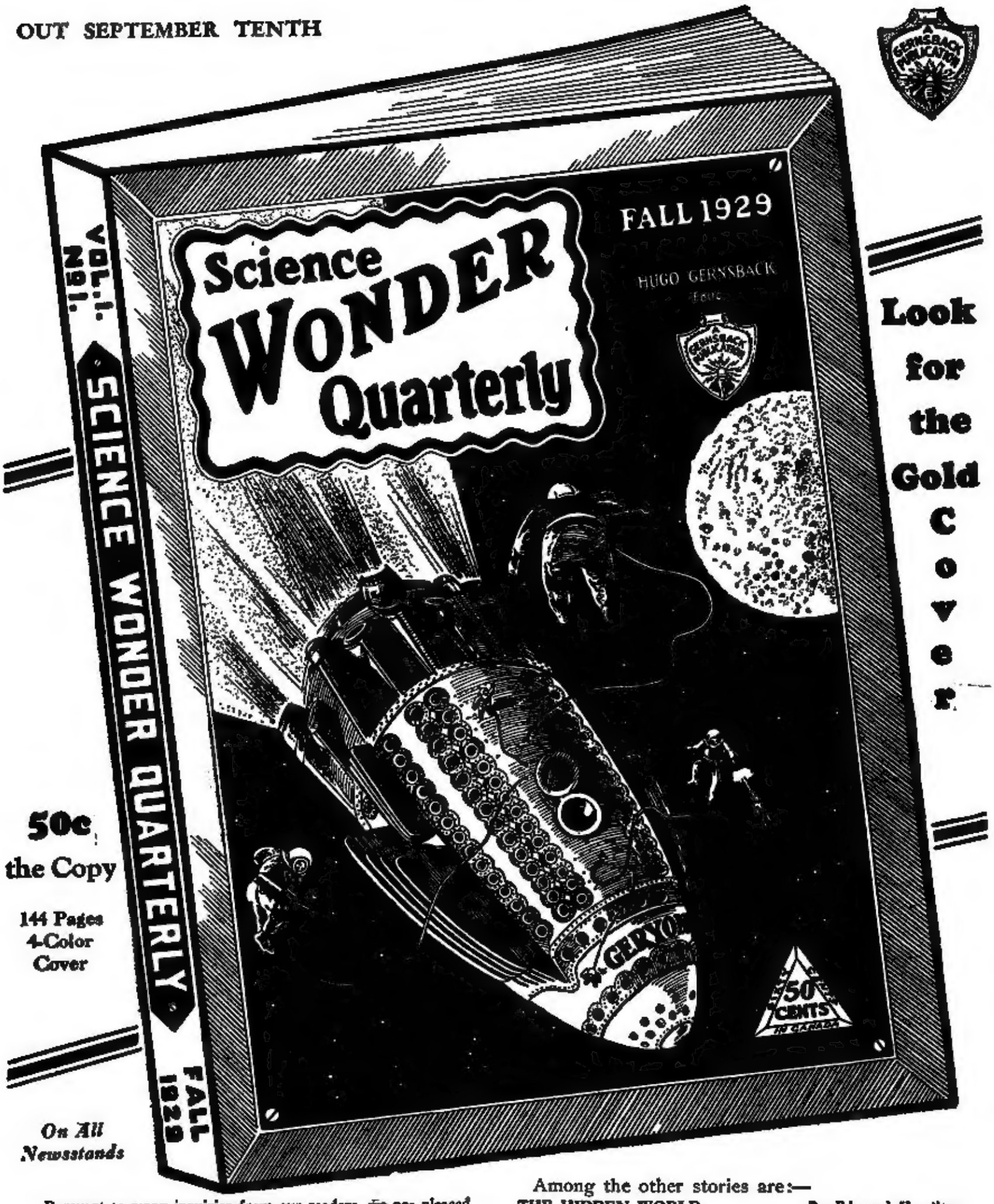

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VOLUME 1
No. 5

Science WONDER Stories

OCTOBER
1929

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These nationally-known educators pass upon the scientific principles of all stories.

WONDERS OF SPEED

By HUGO GERNSBACK

Of all the wonders abounding in the universe about us that go unheeded and unsung, the wonders of Speed certainly should get first attention. There are few things less understood and less appreciated than the meaning of speed. We on earth instinctively exemplify Einstein's theory of relativity whenever the phenomenon of speed comes up; because we always compare the motion of an object with that of some other one. We cannot think of speed without an object to refer it to. Thus, when the traffic officer gives pursuit to a speeding car, he can have no knowledge how fast the offending car is travelling without checking its speed *relative* to his own motorcycle and looking upon his speedometer dial to see how fast he is going himself.

The expression "speed" is by itself entirely meaningless unless the object in motion is referred to some medium; which may be free space, the surface of the earth, a distant star, or any other "frame of reference." We may, therefore, say that speed must be non-existent *by itself*. It must be imagined *relatively*, with regard to time and to some medium.

Leaving this more or less abstract discussion and coming home to more practical things as far as speed is concerned, it may come as a surprise to learn how ignorant the average person is in matters concerning speed in general.

Ask the average person his conception of the fastest rate of travel a human being can ever be subjected to, and like as not, he will say 300 to 500 miles an hour. He is pretty sure that tremendous speeds beyond that become dangerous. Ideas like this remind us of those prevalent when the first trains were introduced and 25 miles an hour was a terrific speed. Then cities passed ordinances in some cases, insisting that the tracks were to be paralleled by high walls; because at the tremendous rate of 25 miles an hour, people and cattle standing near by would certainly be affected by such velocities.

So when you tell the persons whose conception of the highest speed human beings can travel is 300 to 500 miles an hour—that they exceed that figure by tens of thousands of miles, they usually become incredulous. Yet, the earth moves on its axis (at the equator) with a speed of 1,000 miles an hour and in its journey around the sun the earth moves at the rate of some 65,000 miles an hour. But we are not aware of this so-called tremendous speed at all because we see nothing flashing by, and we are blissfully unaware of it. Furthermore, the sun with all of its planets moves probably at a speed much greater than 65,000 miles an hour, and we are not aware in the least of the "tremendous velocity" with which our entire solar system is hurled through space.

The reason, of course is simple; and that is, you are not aware of speed at all unless the object upon which you happen to be traveling is either accelerated or decelerated. If you are on a railroad train running at the rate of 20 miles an hour and the train is *gradually* brought up to a speed of 60 miles an hour; and if you do not look out of the window and if your ears are closed tightly (so you do not hear your car clicking over the rails) you have no means of knowing whether the train runs at a speed of 60 or at 20 miles an hour.

Recently, German scientists have come forward with a plan of sending aerial machines from Berlin to New York within two hours or less. Such an idea should not be scoffed at, because people now living will probably see it done. Speed is not the important consideration of such a craft, but rather the problems of acceleration and deceleration; because if you accelerated one of these rocket machines too fast, you might crush the passengers to death, and disastrous things also happen when you decelerate too rapidly.

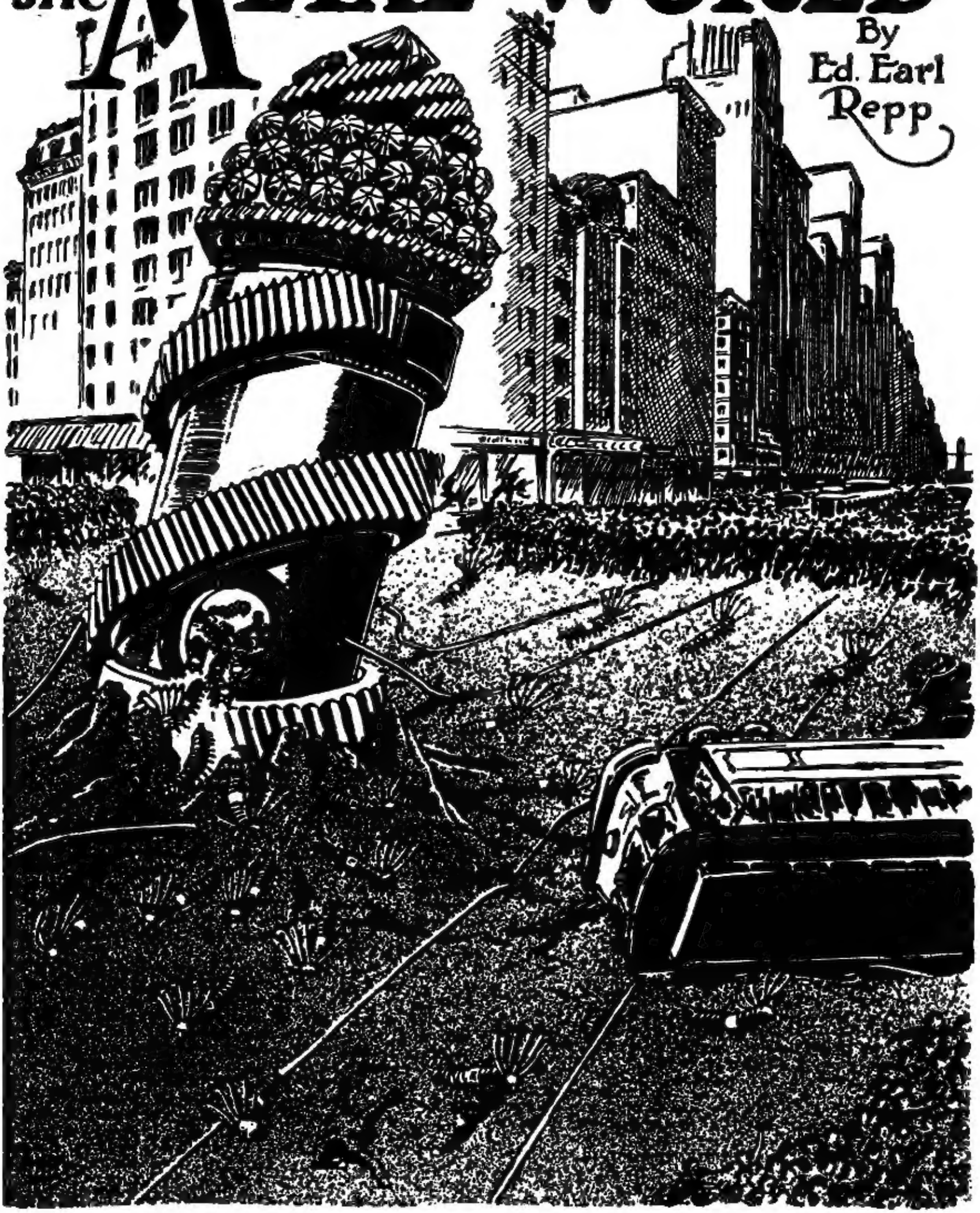
An interesting doctrine as to the condition of objects in motion is presented in the highly-technical Lorentz-Fitzgerald "contraction theory." This theory (which, by the way, is now accepted by practically all scientists) lays down the law that *any object in motion becomes shorter than it is when at rest*. In other words, if you lie asleep in the berth of your railroad sleeper traveling at 60 miles an hour, you measure less than when you are asleep at home in your bed.

Progressively, as the speed is increased, the traveling object becomes shorter and shorter; until finally when the speed of light—which is roughly 186,000 miles a second—is reached, the object vanishes entirely. But suppose you were flying in one of our author's space flyers at the rate of some 95,000 miles a second. You would have shrunk to about three-quarters of your normal size; but you would have no means of ever knowing this, because everything else about you would have shrunk with you in proportion. Even the measuring sticks that you might carry with you would have shrunk with everything else and you would therefore be none the wiser.

Such are the wonders of speed.

The METAL WORLD

By Ed. Earl Repp



The thing came suddenly into the street, its whirling, boring apparatus crashing through a trolley car, spinning it around at a high velocity and finally casting it aside.

IT is hardly possible that anyone in the world is ignorant of the tragedy of fear. From the first day that the invaders popped out of the earth and made their appearance in the heart of every city of consequence on the Pacific Coast, humanity in Western America lived in constant fear. Not since the great earthquake had San Francisco received such a scare and while cities along the eastern seaboard were inclined to consider the invasion as a hoax, the entire Pacific Coast was frantic in its endeavors to find a way to protect its lives and property and retaliate.

There are always those who will not pause long enough to obtain even the slightest knowledge of events as they occur in the world. It is for this class of people that a full explanation of the Pacific Coast tragedy will have to be expounded again.

ED EARL REPP

To begin with let us dwell on the sudden appearance of the machine in the center of the intersection at Market and Powell streets in San Francisco. Bay City traffic was at its noon height when the thing came suddenly into its midst, its whirling, boring apparatus crashing through a trolley car, spinning it around at a high velocity and finally casting it aside like the flying of a governor from its shaft. Instantly that section of San Francisco was in an uproar and the news soon spread around the entire city that it was being attacked by swarms of giant creatures bent on destroying humanity in its entirety.

Even above the roar and crash of the machine's boring screws that twisted the hard, steel understructure of the crowded trolley, the screams of the injured could be heard crying horribly for aid. When the giant trolley car was finally hurled into the side of the Emporium Building, the painful, terrified screams came to an abrupt stop and the stupefied pedestrians, who at that hour of the day were strolling peacefully along the walks in the area, were suddenly and completely paralyzed beyond the power of physical movement. They stood, mouths agape, staring at the tragedy before them.

Gradually the threatening machine, protruding from the center of the intersection like a great steel tank, with jagged blocks of asphalt which it lifted in its upward progress leaning against its dull sides, slowed down the whirling, cutting edges on its nose, and stood ominously silent as though its operators were studying its surroundings before exposing themselves.

I am one of those unfortunate mortals who seem to be on the spot when any great trouble, accident or catastrophe occurs and I had just emerged from the doors of the United States Bank at Market and Powell Streets when the machine poked its spinning nose through the asphalt.

I was stunned by the suddenness of the thing when my eyes beheld the trolley car spinning like a top on the whirling blades of the machine my mind went berserk. Like one mad, I dashed down the steps, completely bowling over two statue-like men and a woman standing on the pavement. The collision seemed to restore my mad thoughts. Then I remembered that as a reporter for the *Outstander* it was my duty to remain and cover the story.

With an effort I halted my mad flight and faced the machine whose boring blades were slowing down. The area in which it had appeared had suddenly become silent except for the ominous whirring of the strange machine's mechanism. It appeared that the unfortunate humans who were viewing the awesome sight of mangled flesh and massed wreckage, notwithstanding the awe-inspiring machine, were hypnotized into immobility. Except for the occasional clicking of teeth of horrified onlookers standing near me, there were no other indications to prove that they were not inanimate objects or clothed statuary.

Market street traffic was at a standstill. Looking up Powell street as far as I could see was a solid mass of heads, strangely immobile, jammed together with eyes concentrated on the catastrophe. Powell street, rising gently from Market toward the hill, offered an unobstructed view of the horrible scene below.

Presently the whirling nose of the machine stopped entirely. From the machine came the sound of weird, mechanical voices, like steel grating upon steel. I stared, terror stricken, at the foreboding tank with its glistening, cutting blades which no

EXPLORERS have often been amazed to find all sorts of life in deep caverns, which evidently have little or no relation to the outer world. It is well-known, for instance, that bats, birds and other forms of life, exist sometimes thousands of feet below the surface of the earth in such subterranean caverns.

How they got there and what their mode of evolution was, no one seems to know.

The present story of Mr. Repp has this scientific fact for a basis, and it certainly makes most interesting reading.

That intelligent beings could only evolve on the surface of a planet, is of course absurd. The chances are that on other heavenly bodies where surface conditions are poor, evolution probably took place from within the planet in most instances, rather than on the outside.

For example, in the case of the Moon, where surface conditions are so poor, it would certainly seem that if the intelligent beings were to be found anywhere, they certainly would be found inside or in the caverns beneath the surface of the Moon.

doubt had bored its way through the stratas of the earth to its position in the center of the intersection.

About midway between the nose of the boring apparatus, and the center of the machine, I noticed a slight movement as a sliding door was silently being drawn open. It was then that I had my first view of the inhuman features of the *Demetriana.

To describe the terrifying features that bobbed before the opening in the machine, one must be almost on the verge of insanity. I shuddered as I beheld them, wondering with alarm, what strange world might boast of such a race. I tore my eyes away with an effort to glance at the circle of terrified faces surrounding the silent, powerful machine that seemed to threaten the onlookers with dire disaster. Women in the gay colors of a San Francisco spring day, working men in greasy overalls, and business men nattily dressed, stood shoulder to shoulder, making no move to run or interfere with the machine which had killed and maimed in its course upward.

After my first mad dash down the steps of the Bank, I felt no further desire to get away. And while I had observed the machine and the features of its operators, I should have dashed away to my editorial rooms to pound out the story for the press, but like all the rest, something held me there until escape through the solid mass of humanity would have been impossible. I am not the type of man to run amuck at the sight of anything so terrifying as the scene in the intersection of Market and Powell. The sight of the dead and dying, mangled and decapitated, was nothing new to me for reportorial experiences offered those scenes—and worse. But no engine of war such as this had ever made its appearance before. Had an enemy of America possessed such an implement of destruction, there would have been a vastly different Atlas of the World than we have today and the United States would have been the subject of some foreign power.

The Demetriana

SAN FRANCISCO was beginning to awaken to the fact that its fair city was being invaded by grotesque strangers from another world. As I stood regarding the features in the opening of the tank, I heard the scream of sirens wafting up Market street from the direction of the waterfront. Louder and louder, like the scream of a tornado, the sirens shrieked as police cars sped on a belated errand toward the intersection. Someone, I thought, must have had presence of mind to turn in the alarm to the police.

During the few moments that followed, before the arrival of the police, I had a chance to observe the strange creatures. Almost at the first sound of the sirens another sliding door opened along the side of the boring machine and out of it poured creatures that caused pandemonium. The frightened screams of women suddenly awakened to the fact that their lives were in danger, and the hoarse shouting of men broke the spell of immobility that seemed to have gripped the onlookers as the Demetrianas made their appearance in the street. I glanced around the half mile deep circle of pedestrians surrounding the invading machine. Women fainted and were trampled. Men, made beasts by terror, plunged madly into the jam in an insane effort to escape the grotesque creatures.

As those in the rear of the first few lines forming the circle became aware of the cause for the sudden milling in front of them, they too stampeded and the entire mob was running amuck. I held my ground just in front of the circle and steeled myself to the shrill screaming of the women. I could not have helped them and my better reasoning told me that I was safer away from the milling, insane humans. The Demetrianas had made no hostile move as yet, I considered, and while their appearance was sufficient to cause the human mind to run berserk, I nevertheless remained near them rather than chance almost certain death under the feet of the panic-stricken multitudes.

The scream of the police car sirens was drowned by the shouting of the terrorized mob. I turned for a full view of the Demetrianas as they arranged themselves in a circle around the machine. As I swung around I felt my elbow touch another and I found myself looking into the serious face of my acquaintance, Professor Roger Blackton, whom I had interviewed some weeks before concerning the possibility of X-raying the earth. His eyes were settled intently upon the strange creatures pouring out of a series of openings along the sides of the tank, taking up position like a squad of special police guarding a shipment of gold. I placed a hand on his shoulder and he leapd aside like one suddenly pricked with a sharp instrument.

"I didn't mean to frighten you, Professor," I apologized at the top of my voice so that he could hear me above the roar of the mob.

"Oh, hello, Dowell!" he managed to smile, "I guess sight of those things shattered my nerves. I wasn't thinking of anything but the terrifying faces of that scourge—for scourge of the earth they are! My God, Dowell, what destruction they have caused among the people!"

"It is frightful, Professor," I conceded, shaking my head. "What the devil delays the police?"

"It's probably difficult for them to negotiate that mad mob, Dowell, without killing right and left."

I shot another quick glance at the creatures surrounding their machine. The circle was widening slowly as the Demetrianas crawled like giant centipedes toward the milling masses of humanity struggling vainly to escape. Yes, like giant centipedes they came on in an ever widening circle!

I shuddered as I regarded them and with my hand on Professor Blackton's arm I felt a tremor surge through him.

The Demetrianas, maintaining some sort of communication between each other by that rasp-like

*Demeter—an ancient Greek name meaning "Sprung from the Earth" and used by the author to convey that meaning.

metallic voice, were not at all unlike the centipedes more commonly known to childhood as the "thousand legger." There was distinct similarity between the two and yet somehow, the features on their large, bony heads seemed somewhat human! From their heads down to the tips of their short pointed tails, they were decidedly *Myriapoda*. They were more than six feet in length, their bodies supported by tube-like, flexible legs that numbered in hundreds, running under their bellies in two rows. Each wore a metallic belt containing small shining cylinders.

Over the heads of each waved six strong, powerful arms that seemed to be jointed at almost the same sections as the human arm. At their ends were four-fingered hands, thumbs absent! In the features of each a pair of deep, fathomless eyes glowed luminously like pale uncut rubies. Their mouths, were like the beaks of amphibious animals of the *Rana* genus. Occasionally they opened their beak-like lips and snapped them like a frog snapping at a fly. Long red tongues flicked forth and disappeared again in deep, cavernous mouths.

Professor Blackton nudged me and yelled in my ear to observe pistol-like objects held in their hands. They clutched them tightly as though afraid to permit them out of their hands.

"Weapons, Professor?" I shouted loudly.

"Certainly, Dowell!" he yelled back. "Do you recall that a few weeks ago I stated that I believed the interior of this old world of ours contained some sort of creature that might be capable of annihilating the human race? Well, Dowell, what I said has come true. These creatures are from the Inner World and the existence of humanity is from now on doubtful! Yes, my friend, they are the ray guns of the Inner Beings!"

"Oh come, Professor!" I yelled into his ear, "They've got into your blood! You cannot mean that!"

Professor Blackton chewed nervously at his lips. He stared at me and spat out a dribble of blood.

"For years I've endeavored to tell the world that the inner earth was just as habitable as the outer surface but none would believe. Now here it is to prove my contention! Here's ample proof—these Demetrian beasts."

"What would they want to do on the surface, then?" I shouted.

Suddenly I saw a greater commotion down Market street. The police cars must have opened a path through the panic-stricken pedestrians.

"How do I know, Dowell!" the Professor yelled. "Probably they want something we have or—Look out, Dowell! Here they come!"

There was a sudden rush of wind as heavy bodies hurtled past me. I was bowled over and over. Sharp thorny objects pricked my skin as the Demetrians raced over me. I caught a glimpse of the Professor. A Demetrian was dashing over him and he shielded his face with uplifted arms to protect it from the pincer-like legs of the creatures.

CHAPTER II

The Massacre

WITH incredible speed—speed as only hundreds of legs can create, the centipede-like creatures raced toward the struggling mob. I glanced at the machine. Demetrians were arranged around it as a protective measure, their oddly-shaped hands held high over their heads, ray guns aimed in a deadly circle. As I lay I wondered what had been the reason for the sudden rush. Why hadn't they destroyed Professor Blackton and myself where we stood instead of merely racing over us? I looked at the Professor. He was rising to a sitting posture, his eyes glued on the Demetrians as they reached the edge of the panic-stricken multitude.

Suddenly there reached my ears a bedlam of blood-curdling shrieks. I leaped to my feet for a better view of the scene. There before my very eyes the Demetrians reached the edge of the jammed pedestrians! At that instant I heard the sizzle of their terrible rays as they swept into the mob, cutting clean paths through it. I saw a ray strike the Bank Building and a wide opening appeared in its walls. Then there came a series of roaring crashes as other buildings, their structural frames weakened by the devastating rays, crashed down. Dust and debris filled the air. My nostrils twitched under the odor of scorched flesh!

Professor Blackton cursed loudly and sank back flat on the asphalt surface, burying his face in his arms. The Demetrians had suddenly turned and were racing back to their machine. I dropped to the street and covered my face. Almost instantly I felt the prick of hundreds of sharp feet as they raced over me. My skin seemed numb from the effect and I lay for what seemed hours before my senses were suddenly aroused by the staccato throb of machine-gun fire. I looked up, half dazed.

What I saw caused my thumping heart to leap. Lined in crescent formation on the edge of the insane mob, and lying flat on their stomachs behind a row of fire-spitting machine guns, were San Francisco's crack police gunners! Each single gun was vomiting pellets of lead and steel into the circle of Demetrians who seemed too stunned at the suddenness of the attack to bring into play the terrible powers that existed in their ray pistols. I heard the rapid tattoo of machine-gun bullets striking the metal surface of the cylinder. They seemed to glance off the heavy steel surface of the machine for I heard the whine of ricochetting slugs passing over my head like so many bees.

Strangely the Demetrians seemed not at all effected by the rain of bullets. Their beak-like lips seemed to open in sneers of contempt. None of them showed any outward effects of the slugs yet I felt that the aim of the police was anything but untrue. Perhaps the creatures were immune to injury or death. What manner of being were they, that they could stand the ceaseless fire from a dozen man-made implements of destruction?

Then, as though by some pre-arranged signal, the Demetrians brought into play again their terrible pale red rays! Instantly the intersection of Market and Powell was bathed with the sizzling beams from their pistols! In one single barrage of rays three of the prone police machine gunners vanished in a puff of acrid smoke and the guns in front of them crumpled as though made of wax instead of highly tempered steel. For an instant the throb of the other guns ceased. Then with renewed vigor they opened fire again valiantly. But to no avail. The Demetrians did not falter for an instant but opened their beaks sneeringly.

As I lay on the asphalt, fearful to rise lest a misdirected ray strike me, I watched the scene with insanity creeping into my brain. I cast a glance at Professor Blackton. He too was lying prone on his stomach, regarding the raging battle of uneven odds. With horror striking deep within me, I saw a pale red ray striking the struggling mob of humans behind the valiant policemen. The beam cut a clean path through it! I caught a glimpse of the tower clock on the ferry buildings at the foot of Market street through the pink smoke that floated over the swathe. Already the atmosphere was stale with the taint of scorched flesh and I wondered how long it would be until the Demetrians actually swept the city clean of human life!

Suddenly I was aware of a burning heat to my left. I looked up. A thin shaft of pale red light was passing over me, to strike the corner of a towering building on the southwest side of Powell. Instantly the corner vanished leaving a gaping hole where the ray had penetrated skyward.

From an opening aperture high up along the side of the United States Bank Building, I heard a sudden staccato rattle of a machine gun; then a barrage of Demetrian rays sought it out and the side of the building crumpled like paper, showering the street below with debris.

Presently I heard the throb of air screws high overhead. Professor Blackton yelled at me to hug the asphalt. There was the roar of an explosion. I was showered by fragments of rock and particles of vermilion-colored matter. But one infinitesimal bomb was all the naval flyers had time to drop before a Demetrian ray instantly annihilated the two planes. They vanished in a puff.

From somewhere inside the boring machine there issued a deep-throated clanging sound. Then as though tiring of the game they were playing the Demetrian warriors began to enter it in groups of threes. The remaining police gunners still bent on wreaking as much damage as they could continued firing. I saw a group of four Demetrians detach themselves from the circle and race toward the remaining guns. As they neared the officers they brought into play their deadly rays. The prone figures vanished and with them went a hundred struggling, jam-locked pedestrians. As the creatures finally crawled into the machine and the opening slid to a close the drone of high powered mechanism could be head from the strange cylinder.

The Demetrian's Threat

AT a small observation window that was still ajar, appeared a grotesque face. Like a whipped cur I watched the Demetrian's beak-like mouth open and I heard a biting voice that cut into all other sounds like a steel file running across a rough surface. My teeth went on edge at the sound.

"Hear ye, Surface World, the message sent to you by Progrious, exalted ruler of the Inner World of the Earth!" the voice rasped in an almost unintelligible jargon. "You of the Surface are commanded to abandon all further exploitation of the earth's resources! They are ours! We demand unconditional surrender of them. If you disobey his command the Inner World will sweep your Surface World clean of its scum! You have taken more than your share of this earth's resources—its gold—its ores—its oils and its gases. What remains belongs to Progrious and he shall retain it even at the cost of the earth itself! Hear ye, Surface World—and take heed!

"You may wonder what happened to your ship the *Cyclops* which vanished thirty years ago during your world war. I will tell you so that you may know our power. On the ragged coast of your land called South America where the ship stopped in a storm, we captured many of your crew and with our ray machines utterly destroyed your ship. The men we captured we tortured until they taught us your language and told us about the world of the surface. How you obtained the manganese ore they were carrying—a metal that belonged to us. We killed those men when we had learned what we wished. We know that you mean to exploit our riches, but again we warn you, they are ours!"

With the last ominous, threatening words, the opening was slammed shut and the machine's mechanism whined. The tank instantly disappeared into the earth, sending high into the air a towering shaft of pulverized rock that showered the entire city of San Francisco with lung tickling dust!

Following the almost instantaneous departure of the machine, it did not take long for the streets of San Francisco to clear. The havoc wrought by the invasion was a havoc that struck terror deep into the heart of the citizens. The number of lives that were lost as the result of the Demetrian invasion was indeed great. But no greater than that suffered in other cities along the Pacific Coast as I learned when I tramped wearily into the offices of the *Outstander*.

The editorial rooms were in a state of unleashed activity! The radio, telephone and cables sputtered under the pressure of constant usage. The wires hummed with reports from Los Angeles, San Diego, Seattle, Portland and points as far east as Salt Lake and Denver. Each of the cities had been visited by the Demetrians and to each had been given the warning to abandon all further work in removing the world's natural resources from the earth. Los Angeles reported that at precisely high noon, a Demetrian machine plunged upward through the

car rails in the center of Seventh and Broadway and suddenly let loose a barrage of deadly rays. Three heroic officers had lost their lives in the City of the Angels when they drew their guns and attempted to shoot it out with the invaders. Santa Fé Springs and Signal Hill, Southern California's greatest oil fields were visited by a machine and destroyed, their reserve tanks left burning, derricks and towers laid in ruin.

From other cities came similar accounts. The havoc wrought in Seattle resulted in the destruction of many buildings and the loss of considerable life. When the Demetrian machine popped up there, a celebration of some sort was in parade and the whirling blades of the invader tore into the mass with frightful casualties. Seattle reported that everyone in the city was leaving at once for higher ground in the mountains thinking to escape further encounters with the invaders.

In Salt Lake City, a machine appeared on the grounds of the Mormon Temple, tearing out several sections of the building as it arose. The State Militia attempted to destroy the machine but gave up the struggle after half of their number had been wiped out by rays. Denver was hard hit, reports declared, and San Diego suffered a terrible loss. Rockwell Field there had been practically destroyed. Portland told in cryptic code of the invasion and stated in no uncertain terms that it had no intention of giving in to the demands of the Invaders. While they did not show any hostility toward the Demetrians, they told them that mining in that section would continue regardless. To retaliate the creatures felled ten city blocks!

Dejectedly I sought out my desk and sat down hopelessly. I had not been the only reporter from the *Outstander* who had witnessed the scenes at the intersection of Market and Powell. Others had watched the destruction from the roof of the press building and flashed the news around the world long before I succeeded in finding my way through the frenzied mob.

Not least of the sensations created by the beasts was the information they gave us about the *Cyclops*. For twenty years the disappearance of this 19,000-ton collier of the United States Navy had puzzled the world. Leaving the Barbados, West Indies, on March 4, 1918, with a crew of 15 officers and 221 men, and 6 officers and 51 enlisted men as passengers and carrying a load of manganese ore, it had never been heard of since. That the Demetrians could have completely destroyed the ship we could not doubt, having seen the evidence of their strange powers in the raids on the cities. That they should exact information about our world from the unfortunate captives and then kill the men, betrayed natures at once cruel and relentless. The world was faced with a powerful enemy.

For long minutes I sat, head lowered, eyes closed to shut out terrible, persistent visions. I turned at the touch of the City Editor's hand as he reached out and tapped me on the shoulder.

"Snap out of it, Dowell," he said, chewing savagely at a cigar. "Chase up and interview Professor Blackton! He called for you this minute. He may have something important to say And, by the way, dig up that old statement of his concerning life within the globe."

CHAPTER III

The Professor's Hope

"WE meet again, Dowell," Professor Blackton said pleasantly, opening the door of his laboratory in response to my ring. "You don't look much the worse for wear."

"No," I said, "but I feel as though I've been stung by a whole hive of bees. Those devils have mighty sharp toenails to pierce a man's coat, vest, shirt and so on."

"Well I'm glad it wasn't a Demetrian ray that pierced you!" he grinned. "You came pretty close to getting that ray that struck the Flohart building. I thought they had your number for a second. But come right into the laboratory. I want to show you something."

"With pleasure, Professor," I replied, wondering what was in store for me. "I hope you've conceived some method of retaliation against those contemptible insects! They deserve complete annihilation!"

"That's just what I've been working on, Dowell! When I said years ago that it was possible for life to exist below the surface of the earth, I meant just that and began work to learn just what sort of life it was. At last I have reached my objective——I'm going to open up this old world and see what its made of!"

"You're going to what?" I queried, astounded.

"I'm going to X-ray the globe, Dowell!" he said, enthusiastically. "You see, I have developed a series of tubes embodying the combined radiations of the Röntgen Rays with the Coolidge tubes. It was not until a short hour ago, however, that I've been able to add to the results the powerful radiations of a special tube made for me by Bliss—the Bliss Vacuum. I have worked out the phenomena of interference and ascertained that electrostatic forces have been the cause of the past failures in X-raying great, solidified bodies like bank vaults, buildings and—the earth. I have overcome these interfering obstacles by the process of combining infra-red rays with high frequency cathodes with results that the objects will be penetrated by ultra-red rays making the bodies almost as transparent as glass. On passing from air into water, carbon disulphide, aluminum, rock, basalt, iron, lead or any other substantial material of the earth, my ultra-red rays will suffer no noticeable diffraction.

"As to the intensity of the rays, I have no fear. Their power to penetrate, through the combined radiations of the tubes and systematically controlled vibrations of light, is unlimited. I will have complete control over them by a system known as the X-ray galvanometer."

"That's wonderful, Professor!" I said warmly. "Just think what your X-ray will do then, for locating such valuable resources as we have in our earth. It will be the greatest divining rod the world has ever

known! Why, Professor, an X-ray of the earth will reveal the exact locations of gold, silver, platinum, oil and——"

"Correct, Dowell, my boy. But you seem to forget that we of the Surface World are commanded by the exalted Progrious of the Inner World to cease removing the resources from the globe," Professor Blackton said seriously. "The resources are remote from our minds now. Our lives must have first consideration if we must continue to exist."

I felt my brows go up automatically and scowled.

"Of course the Surface World does not intend to knuckle without a fight, Professor," I said.

"That's true, but you cannot fight the unknown, Dowell," he said, knitting his brows. "If my X-ray is the success that I feel certain it is, then the Demetrians will no longer think they can frighten us into complying with their demands. I shall learn their secrets by X-raying them, and by their own methods we shall wipe them out entirely. By that alone we will have peace and no further fear of them. My only hope is that the government will co-operate with me to the fullest extent."

My heart leaped. If Professor Blackton was of a sane, reliable mind; then what more could we of the Surface World ask of him!

The Inner World

"MY God, Professor, there's millions of them—literally millions—crawling around like vermin of the dead! Here look into this funny shaped dwelling!"

Professor Blackton climbed down off a high structure which supported a long, heavy tube of shining brass, and strode swiftly to my side where I stood gazing tensely onto a screen on which was reproduced the life miles upon miles below us. There exposed on the screen of the Professor's own creation, lay the domain of the Demetrians!

The entire Inner World lay open in miniature on the screen and the Demetrians, millions of them, were crawling through mazes of strange vistas and tunnels that formed the thoroughfares of a world hewn from solid metal! A metal world! Far below the surface of the earth, could be seen hundreds of their machines, cutting blades spinning at front and rear, burrowing through the earth's stratas of metal and rock like gophers in soft, dry earth. The pull and push of their blades carried them swiftly as though they were burrowing through sand. Their progress could be clearly followed by loose, pulverized earth that was left in the tunnels behind them.

The Inner World seemed to have been hewn from a solid mass of metal far in toward the core of the earth! The material glistened like the polished surface of a meteorite! Here and there in the metal walls that formed the sides of what appeared to be Demetrian dwellings, were occasional dark spots of iron, while the prevailing brilliancy of the majority of the metals glistened under a pale red luminosity like polished nickel. Directly in the center of this strange domain stood a great mausoleum-like structure surrounded by doubtless thousands of the strange boring machines. The architecture seemed oddly familiar, being similar to that of the far east. I turned the screen over to Professor Blackton and stood aside, regarding the X-ray apparatus while he studied the Demetrian objects officially.

Professor Blackton's X-ray machine seemed hardly different from the giant telescopes of Mount Wilson observatory. Although somewhat narrower and not quite so long as the great Hooker telescope, the X-ray would have been accepted at once by a layman as being an instrument of astronomical science. But if one had observed the mechanism of the apparatus in the interior of the tube, and in substantial aluminum housing arranged at its base, then perhaps it would have been accepted for just what it was—a great X-ray machine! Arranged in positions at the brass cylinder's base were various tubes aglow with many beautiful colors. By some process which I did not understand, Professor Blackton had prepared prism reflectors surrounding the glowing tubes that carried their radiations into the cylinder which in turn grounded them into the earth in the form of penetrating beams.

By a strange network of copper induction tubes it appeared that the rays were radiated from the earth and concentrated into a shining silver ball which forced the transparency of the X-ray pictures into a heavy leaden box under the screen. By another process known only to Professor Blackton, the X-ray pictures were reproduced on the screen with results that thousands of cubic miles of the earth's interior were defined clearly before us in a space not more than thirty-six inches square. But, above all, the domain of the Demetrians lay exposed with stereoscopic clearness and Professor Blackton was making the best of the situation.

He twisted a tiny knob. A unit of delicate mechanism began to hum somewhere under the screen. I caught a glimpse of dark paper sliding over rolls under the luminous square, to vanish in a circular tank containing some rank acids. Professor Blackton had even prepared the delicate, intrinsic process for reproducing in photographic form the objects defined on the X-ray screen!

"Dowell!" Professor Blackton called suddenly, as I studied a series of large, glowing tubes.

"Yes, sir!"

"Stand over to the left, just beyond that drying tank, and catch the photographs as they come through! I haven't erected an accepting chamber yet. You will want to take those pictures to the *Outstander*. Handle them carefully, as they are invaluable."

"Lord!" I gasped, laying my hands on the first strip of paper, now white and dry with reproductions of the Demetrian scenes printed on it. "What a story! What a life saver for humanity! And vengeance—— ah, that was it, vengeance on the scourge of the earth! Vengeance for those poor people of the *Cyclops*. We'll fool the Demetrians! They don't seem to give us credit for intelligence! They believe they are safe from the wrath of the Surface World. We'll show 'em!"

"Yes, my friend, we'll show them something!" the Professor stated flatly.

As the dried photographs came through the drying

tank I found myself visioning a wholesale invasion into the metal world. Then suddenly I remembered that miles upon miles of solid rock and metals barred Surface bound humanity from invading the Metal World below, and my hopes fell disconsolately.

Presently Professor Blackton stood erect and pressed a button at the control board. The screen went dark as the last strip of photographs came into my hands. I placed it on a table with the rest and regarded the Professor. He stared at me for several seconds and then motioned for me to sit down at a desk located at the other end of the laboratory. Handing me a sheaf of paper he bade me jot down his statements. Ready, I watched his face. It glowed with deep satisfaction and I wondered how he could express such emotion in the face of a situation that spelled almost doom for the human race. For certainly it could not exist without the resources that environment had made necessary to maintain its existence and we would fight to the last for those things.

"My friend," Professor Blackton began, "my experiments have been a success! I have succeeded in creating a system for X-raying the earth! You have seen for yourself. There should be no doubt in your mind!"

"But Professor," I interjected seriously, "How will your X-ray aid us in retaliating against the Demetrians?"

He laughed pleasantly.

"I was coming to that, Dowell," he said affably, seating himself on an upturned container beside me. "Are you ready to proceed?"

"Shoot!" I said, simply.

CHAPTER IV

Desperate Straits

WHAT Professor Blackton told me there in the semi-darkened laboratory in his home perched high up on Nob Hill caused my heart to skip many a beat. After he had finished making lengthy statements in cut and dried scientific parlance, I could see that the Surface World need have no further fear of the Demetrians. In my story which covered the entire front page of an extra edition of the *Outstander*, as everyone knows, I gave a detailed account of his statements, plans and hopes. I told how such strange creatures as the Demetrians came to exist in the world far below us.

Without flourish or padding, the accounts acquainted the public with Professor Blackton's proposed plan for retaliation against the Demetrians. San Francisco abandoned its fright to some extent and went wild with enthusiasm.

Professor Blackton's statements were broadcast around the entire world and the wires hummed in return with expressions of appreciation and confidence from the cities that had been invaded. The Governor at once wired a lengthy telegram to the publisher of the *Outstander* offering publicly all the wealth and materials that the State of California possessed, to the disposal of Professor Blackton, who in turn called the Governor on the phone and made known his needs. His every wish was granted and events were not long in shaping themselves after the State of California opened its vaults of wealth and resources to the cause. Official wires from the Federal Government gave California a staunch backing. The states and city governments in whose territory the Demetrians had appeared likewise made known their desire to aid the Professor in his plans for retaliation against the inhuman creatures of the Metal World.

Professor Blackton appeared to have drawn into a shell after making his statements to me in the laboratory. He seemed unapproachable for several hours, and then out of a clear sky he phoned me at the office.

"Dowell," he said, "I'd like to have you accompany me to Alameda. Can you make it?"

"Meet you at your home in twenty minutes, Professor," I replied, grabbing my hat. Waving at the City Editor, I dashed out of the editorial rooms and into the queerly vacant avenues. Market street was deserted. In the growing dusk of evening the absence of the throngs gave the city the appearance of being abandoned. Except for patrolling officers and a few hurrying pedestrians here and there, gay San Francisco was otherwise a dead and forsaken City!

When I reached Professor Blackton's residence he was standing at the door, hat in hand, staring at the sky in the direction of Alameda. His face seemed to have aged during the last few hours and his shoulders, usually straight and military, drooped.

"What's wrong Professor?" I asked, mounting the heavy stone steps that led to an elevated *patio* in front of the house. "Are you ill?"

"Sick at heart, Dowell!" he said, shaking his head. "Look!"

He lifted a shaking hand and pointed at the sky.

"My Lord, Alameda is afire!" I almost shouted.

"Yes, Alameda——the government yards, have been laid to ruin by the Demetrians! They've learned somehow of my intention to construct my Earth Boring machines, Dowell, and laid waste the materials stored in the government warehouses."

"How——how in h——?"

"Yes, my friend, how did they know? Some system of keeping tab on our activities, I suppose. It looks bad for us, Dowell."

"What do you mean, Professor?"

"It means that if they continue to interfere with my plans then we will be at their mercy entirely. But come, I've wired Mare Island. They'll drydock several cruisers and strip off the armor plate to build our machines. We can't lose a minute. Now that they believe they have us on the run, the beasts are likely to appear at any time in force!"

The Golden Gate airport was deserted except for one small pursuit ship bearing the insignia of the United States Air Forces. Where ordinarily planes should have been seen by the hundreds, a single craft rested at the end of the field like an abandoned chick. As we raced across the field, the ship made contact and her airscrews roared, causing her to tug at the blocks. The pilot motioned me into the gunner's cockpit. I climbed in while Professor Blackton seated himself without helmet or goggles, in the fuselage. Before I

had become settled, the ship was racing down the field. With a sudden take-off and steep bank into the air, the ship heeled Southward. I clutched at the sides of the fuselage to retain my seat, as the craft straightened out with a jerk. The pilot seemed to understand that speed was required in Professor Blackton's mission. He open the throttle to capacity and the ship scudded through the darkening heavens like a migratory bird.

Building the Borers

WHAT transpired at the Mare Island Navy Yard is a matter of history. In brief, I might re-count that six battle cruisers were stripped of their great armor plating, and the plates lifted in huge slabs into great, open hearth furnaces. Sweating men worked tirelessly at the furnaces. Molten steel, sputtering and singing loudly under the pressure of the blasts, began to pour out into giant ladles. Overhead cranes lifted the ladles of sizzling metal and carried them to another section of the mile-long shops. There the contents were dumped into other furnaces to be alloyed with a prepared combination of metals that with the armor plating added, were to form the surface hulks of Professor Blackton's Earth Borers.

Fascinated, day after day, I watched the activity and the various processes from a control cabin slung under the cross beams of a giant crane. This was my vantage point when not sleeping or eating. Occasionally I caught a glimpse of Professor Blackton. Frequently I saw him test the glowing metal as it poured out of the alloying crucibles with great cylindrical moulds. He seemed alive with energy and appeared to be watching every single process in the making of his machines. When he was not to be located in the furnace section he was to be found in the machine shops, where high velocity turret lathes were turning out boring blades and mechanical parts for his machines.

With growing uneasiness as the days passed I found myself speculating upon the Demetrians. One day as I watched several giant cylinders being lifted out of the moulds and carried into the machine shops for assembling, I wondered why the scourge had not appeared at Mare Island and laid it in ruin to prevent the construction of the Professor's boring machines. Perhaps after all, I thought, the Demetrians were not aware that Mare Island was the point of that activity. Or perhaps they feared to show themselves in view of a dozen battle cruisers swinging at graceful anchor just off the coast with batteries trained on the area surrounding the shops, ready to launch their missiles of destruction at them on an instant's notice. But nevertheless I could not allay my fears that their pale red rays would eventually find a perfect mark in the long buildings despite the presence of the cruisers.

Then one day from sheer exhaustion I dozed in the crane's cabin. The hubbub below continued, yet I did not hear it. Frequently I awoke with a start when the crane quivered under the weight of its burdens. Presently I became aware of a different sort of sound than those to which my hearing had become accustomed. I stared through the cabin windows to the floor below.

Elevated upright on platforms in the center of the floor were a dozen huge, formidable-looking cylinders. So similar were they to the Demetrian boring machines that I felt suddenly afraid that the navy yard had been invaded. But my fears were short lived when I caught a glimpse of Professor Blackton surrounded by a knot of men, standing near the tanks. Elevated as they were, the boring blades of the machines whirled clear, emitting high sounding shrieks as the wind of their own making whistled sharply into the grooves in front of the cutting edges. The machines contained two boring noses, one on each end, and like the Demetrian tanks, had a number of sharp guiding fins protruding from their rounded sides. In all, they looked to be exact duplicates of the machines that had invaded the cities of the Surface along the Pacific Coast. I felt a sudden warmth of feeling for Professor Blackton. He had learned at least one of the Demetrian secrets!

With a feeling of pride in the Professor I climbed down from the cabin. Through the open windows of the shop I could see the heavens lightening in the east. When I reached the floor the cool breezes of early morning, drafted through the open panes, brushed my face. The roaring furnaces had long since been shut down. The work of assembling the machines had required the attention of every available man in the yards. I felt guilty of desertion for having remained in the crane cabin, but I had gone there out of danger at Professor Blackton's request. I could not have aided much in any event.

The Professor nodded as I approached the group. The wind created by the long line of whirling blades lifted my hat and sent it soaring. I let it go in my eagerness to inspect the cylinders.

"Looks like you've done it, Professor!" I shouted to him. "They're Demetrian tanks or I've never seen one!"

He appeared not to have heard and turned to speak to an officer in the group.

"Follow these instructions out to the minute, Commander," the Professor yelled into the officer's ear, handing them a sheaf of parchments. "I'm going back to my laboratory to watch the results in the X-ray. In exactly one hour you will send the machines into the earth from where they rest. I'll advise you of the results personally. And thank you for your wonderful co-operation."

"My only hope is that you will succeed, sir," the Commander replied, reaching out a grimy hand. "I shall make no error, you may rely upon that!" Goodbye, sir!"

"I have utmost faith in you, Commander," the Professor said. He turned to me. "We shall return to the laboratory, Dowell. I'll explain everything when we——"

Before he could finish his sentence the entire world seemed to sway under the vibrations of sudden explosions. At Professor Blackton's heels I raced to the windows and stared out over the Pacific. A great cloud of black smoke was rising from the water and I caught a glimpse of a conning tower as it vanished below the surface.

"God!" Professor Blackton groaned, "they have

come—they've destroyed a cruiser! Down flat, Dowell—lie flat!"

Quickly I dropped to the floor. Another tremendous explosion shook the earth, then another and another.

Without waiting to see the cause of the explosions or the results, Professor Blackton leaped to his feet and raced frantically toward the row of Earth Borers, their blades spinning at unbelievable velocity. I heard him yell loudly to the Commander.

"Let them down—let them down!" he called at the top of his voice. "Let them down! Quick!"

Instantly the machines were lowered. The boring blades bit with a whine, into the concrete floor of the shop. Professor Blackton raced away from them under a shower of pulverized cement. Under their great powerful forces the machines were quickly disappearing into the earth. The entire roof of the building was lifted high into the air under the force of the upward discharge of earth cast up by the borers. I hugged the floor near a wall expecting momentarily to be crushed to death by the fall of the heavy steel roofing.

Presently there came a frightful crash as the twisted mass fell to the ground yards away. I stole a glance overhead. My eyes beheld a criss-cross of pale red rays as they struck the walls of the building toward the top. The walls vanished as though they had never existed, clipped as clean as if sheared off. For a long time I lay still figuring that the next second would be my last. But I failed to feel the heat of Demetrian rays. Heartened, I looked around. Professor Blackton was lying prone on the floor near a dead furnace, regarding me through wide-open eyes.

We lay still for several more moments and then he waved to me. I arose and followed him quickly out of the building. Others trailed us. Outside I glanced around, glad indeed, to have escaped thus far the devastating rays of the Demetrians. In a field to the left lay a huge, twisted mass that was once the roof of the Navy Yard shops. I caught sight of feeble motion underneath it and then there came into full view suddenly the grotesque form of a Demetrian.

"Professor! Look——the Demetrians!" I cried, pointing.

Overhead I heard the hum of air screws. I looked up and saw six closely assembled objects racing earthward. Almost instantly there came the roar of a terrific explosion. The bombs had struck the mass of twisted steel. Nothing could survive that demolishing barrage, not even an invincible Demetrian tank.

CHAPTER V

Something About the Demetrians

IN the laboratory of Professor Blackton we watched the rapid progress downward of the earth borers —emissaries of destruction that were hoped to destroy the Demetrians in their own Inner World.

Quickly after our arrival at his San Francisco residence and laboratory, Professor Blackton set to work re-arranging his X-ray screen. In a few short minutes he had finished his work and the scenes disclosed by the X-ray were projected onto a larger screen arranged on the wall of the laboratory.

In response to a number of telegrams sent by the Professor many famous scientific personages were conversing in the Blackton living room when we returned. Professor Blackton was at once besieged by his fellow scientists and congratulated from all sides for his remarkable achievements with the X-ray. He immediately waved them into the laboratory with a few words of greeting, and they arranged themselves in chairs in front of the larger screen to await developments.

When the first of the penetrating beams entered the earth and radiated their fluorescence on the screens, the laboratory became a hubbub. To me it appeared that each spectator in the room was trying to talk at once, with results that the room reverberated with a meaningless jargon of unamalgamated sounds. Gradually, as the X-ray beams penetrated deeper, disclosing on the screens the various stratifications of the earth's inner materials, the scientists became quiet, and stared intently at the scenes in front of them.

Presently Professor Blackton twisted a knob on the control board and the screens glowed brighter. With stereoscopic vividness the domain of the Demetrians lay exposed before them. They gasped in astonishment.

"Gentlemen," the Professor said, "you may observe the twelve earth borers which we sent into the ground at Mare Island this morning. Within fifty minutes they will reach the Inner World which you see in the very center of the screen. What do you think of the Kingdom of Progrious? Quite a world, is it not?"

"A metal world!" I heard one of the scientists gasp.

"A metal world, doctor," Professor Blackton agreed, "but an evil one! In an hour I hope it will be no more."

"But how do you propose to wipe it out, Professor?" asked an eager voice. "Can you enlighten us as to the origin of these creatures?"

"I think I can explain within a short time, my friends," he replied, softly.

"When I first beheld this strange world yesterday, through the X-ray screen in front of me, I became firmly convinced that the Demetrians were products of a strange environment. At some distant period they may have been surface beings who became enveloped underground by the upheavals of the Volcanic Era. Unable to escape, they were forced to adapt themselves to that environment. Results were that they developed to the form of an insect, the only form of life capable of existing below the earth's surface. Like we of the Surface, they gradually developed material things such as artificial lighting, transportation, dwellings and other objects you see on the screen before you, as well as long lines of science of which we have been in ignorance. Their rays, for example. Having observed these rays from various angles, I believe that they are the result of a process of concentrating a terrific heat into a very small area. Assuming that such an enormous pressure as 50,000,000 pounds per square inch could be concentrated in a tiny cylinder comprising an interior area of six square inches; then the force of

(*Continued on page* 458)

The Ancient Brain

By A. G. Stangland

He adjusted a long tube that arched over my head. Suddenly it glowed dully and crackled with a high pitched note, continuing so for five minutes. Slowly I became conscious of a low hum in my head that I tried to locate but failed . . . . my senses were tricking me at times.

THE ANCIENT BRAIN

THE first glimmer of consciousness came to me; I opened my eyes. They looked squarely into those of a white robed man bending over me; kindly eyes of light blue that twinkled. He turned to another man dressed as he was.

"Doctor, you can consider this one of the greatest moments of modern medical science. Together we have labored incessantly, and now, the triumphant hour has come!"

"Yes," was the solemn answer of the other. His face was grave, and showed the lines of worry ond fatigue.

ALLEN GOLLAND STANGLAND

Where was I? That horrible, blinding flash—! Ah, thank God, I was not dead after all. Nurses, doctors, medicinal odors—all told me I was in a hospital. Vivid memories came into my mind. I was back again in the college electrical engineering testing laboratory. Quite distinctly I recalled going over to the control board to step up the voltage for a new experiment. As in a dream, I saw myself put my hand out to the great resistor, saw with horror a connecting cable from a high tension jack dropping from the top of the control board. Too late—it touched my forearm. Stabbing blue flames leapt before my eyes, and then—the soft velvet of oblivion.

"How long have I been here, doctor?" I asked weakly.

The other studied me a moment, and then intoned very solemnly:

"Ten thousand years."

Great God in Heaven, was the man mad! Ten thousand! Rot.

"Great Scott, doctor, my question was perfectly civil. Need you cavil now?"

He turned to the other, his evident colleague.

"You see, there has been no impairment of the sulci and fissures. His psychological reaction is quite normal. Indeed, we are fortunate."

He then surveyed me with a kindly and friendly mien. "Young man, you have verily been dead for ten thousand years. We are just a little uncertain as to the very early history of your brain, but this we do know; you were electrocuted in a college of Western America, Oregon State College, I believe.

"Your brain, for some reason or other, was not injured by the electronic flow through your body. Pioneer doctors in the field of brain surgery undertook an experiment to keep your brain alive for as long as it would survive. It was studied and weighed and photographed for one hundred centuries until it became known as 'The Ancient Brain' to all the scientific world. Most of our latest knowledge of the field of biochemistry and its relation to psychology has come from a scientific study of your brain. And now, the last most important experiment with your brain is its transference from its platinum 'cranium' to the body of a young man. For thirty-six hours Dr. Volor 146M22X18 and myself, Doctor Sine 8802W75MN63, have worked unceasingly, preparing your bundle of nerves for its new abode. Your capacity for brain development has been increased ten-fold. Whereas, before, your capacity was three hundred cells, it is now about three thousand. All the most modern means of medical science have been employed to prepare your brain for its development in this far more advanced world of today."

I lay thinking and pondering upon this staggering information. Dead for ten thousand years! And now, in this vastly altered world I should have to find my own way, all my friends gone, with a new body to exist in. The last thought startled me into movement. What kind of body did I have?

"Doctor Sine, may I get up to walk around? I should like to see the new home you have given my brain."

"You can move about, but be very careful in your movements as you will have to become familiar with your new anatomy. With all of our advances in science we have been unable to create co-ordination between your brain and the new nervous system. That will have to develop naturally as your brain controls the new nerve fibres."

Assistants helped me from the bed in which I lay, and stayed beside me as I began to walk. My movements were a little slow I thought, for in my other body I got about rapidly; it was characteristic of me. I looked at my hands. They were somewhat smaller than the memory of my former limbs, and were of a finer texture

YOU can take a live fish and with proper precautions, freeze it and keep it frozen without injuring it. Exactly how long it can be kept in this condition, no one knows. Inasmuch as in the frozen state the fish does not consume any energy, it is believed that it could be kept so for decades and perhaps much longer, and still revive at the end of that period.

It is also well-known that certain animals hibernate for many months at a time without freezing and yet emerge into the world and go on living very nicely. Suspended animation, then, is not fiction, but actual fact. There is no good reason why parts of the human being or even the human machine as a whole could not be kept alive for years without deteriorating, providing the method used is correct.

The present story is exceptional and expresses this thought in a most novel manner. There is no reason why, sometime in the future, Mr. Stangland's idea will not be realized, at least in part.

in skin. I came to a mirror. Wondering what I should see, I stood before it.

I had the anomalous sensation of feeling that I was merely an entity of intelligence in the ether, and that I was surveying a stranger upon whom I had come. I saw a comely looking young man about twenty years old, of slight build—by my memory of former standards—with very intelligent looking eyes. The head was a little large for the body, but as I looked at the people about me, I saw that theirs were of similar proportions. No one spoke; all were quietly observing me and watching my face to see my reaction to my new environment.

Doctor Sine and Volor came toward me. Both were dressed in white garments consisting of a loose fitting blouse, and what looked like riding breeches, which I found later to be about the standard dress of the people; the color alone differentiating the profession of the wearer. Comfort was paramount in the styles.

"And now that you have seen yourself, what do you think of your new body? The young man who was the former possessor of your body was a laboratory worker in the government chemical research laboratories. He was engaged in obtaining a new element from the sun by means of the new electrothermic oscillator. When found, the delicate cells of his brain were discovered to have become a gelid gelose from exposure to the rare element."

I must have turned a ghastly white, for both doctors pressed forward anxiously.

"Surely there can't be a failure of one of the cells of the corpus callosum, Volor," exclaimed Dr. Sine, "we checked all the nerves going into the prosencephalon."

"I'm all right, Doctor," I reassured him.

"Come into this room and rest for a while. There is something here that may interest you besides," and both led the way into a dimly lighted circular room. I was motioned to a seat near Doctor Sine, while Doctor Volor took a position near a control panel covered with small buttons.

CHAPTER II
Jak 158MNC802

"WE are now going to show you some very excellent stereoscopic photo-cell pictures of your brain," began Doctor Sine. "You will notice over there in the gloom a huge krypton tube and exactly opposite it on the other side of the room another one. Using the old, simple television system of the projectoscope, these tubes change the photographic waves on the wire spools into light again and throw it on an electronic screen in the center of the room."

The room was totally darkened. In the center of the room something was beginning to glow and take three-dimensional extension. Finally, it was resolved into the forms of two men whom I recognized as the two doctors. The effect was startling, for it appeared as if the two were in actuality in the middle of the room. But what was more startling and electrifying was the object they were bent over. It was the brain of a man. The two scientists seemed deeply engrossed in a pencil of orange light they were focusing on a part of the brain.

"There you see us beginning to culture the cells of your brain so that they can develop to a greater degree. We found that only a small fraction of the total capacity was developed naturally. The tube you see me looking through while Doctor Volor trains the electro-culturer on the cells is an electric microscope with which I am watching the cells as they expand."

Fascinated, I continued to stare at the stereoscopic effect. To think that that very brain on the screen was now seeing itself! It was amazing. The scenes changed, and I saw a body in a circular room. Around it were the two doctors and several assistants who appeared very busy about a silver sphere which had tubes and wires emanating from it going toward a glass cage that contained intricate and complex apparatus of an electrical nature beyond my comprehension. The assistants stood aside, and the two doctors, finished with their work on the body, very carefully, yet easily, opened the silver sphere. Inside it reposed my brain. With the skill of highly trained surgeons they placed it within the cranium of the body. When the top of the skull was replaced, the wound where the knife had cut was bathed with a chemical solution, and then treated with yellow rays from a huge tube. In a very short while the cut healed, and all signs of the surgical operation vanished.

Following the showing of the picture, Doctor Sine took me into a large, palatial room. My eyes were ever meeting new objects of interest. Huge glass mirrors surrounded by complex apparatus stood in the walls, and in the mirrors individuals seemed to be holding conversation with people in the room. Others appeared to be writing, their motions being duplicated by an automatic pencil operating on a slanting desk before the mirrors. We approached a young man just turning away from one of the glass screens, evidently a television instrument. He had a large forehead, and keen, piercing eyes.

"How do you do, Doctor Sine," he exclaimed in a firm masculine voice, glancing at me eagerly in turn. and bowing slightly.

"Jak, I wish to acquaint you with—er—ah—hysteresis, I've been so interested in a scientific sense in this gentleman that I've failed to learn his numerical name!" and the Doctor, reddening a bit, asked m[illegible]

"Doctor, I don't quite understand what you mean by 'numerical name,' however, I was at one time in the dim past known as William Allen Golend."

"Ah, then our ancestors did not have the system of registering numerical surnames as early as some historians would have it. Jak, I take great pleasure and pride in presenting my friend, William Allen Golend; William, my esteemed young friend, Jak 158MNC-802."

Instinctively, I was drawn toward the intelligent

looking Jak. I put my hand forward to shake his. He gazed at me and at my outstretched hand quite at a loss as to what to do. Suddenly, a dazzling smile spread over his handsome face.

"By the sacred constant Pi, forgive me, William; my usually perfect memory slipped for once. I forgot my history of ancient customs," and he grasped my hand in hearty handshake.

"I might tell you that Jak is one of the best mathematicians the Interplanetary Co-ordinated has on its interstellar navigation staff. He has been a deeply interested follower of my experiment on your brain, and has taken it upon himself to help you orient yourself in this new world. You may now consider yourself a free citizen of Aerial America. All I ask of you is that periodically you come to my laboratories here for psychological examination to aid me to consummate my greatest experiment. Any time that you are bewildered by this world and want counsel, you are cordially asked to consider Doctor Volor or myself as your intimate friend. And in the meantime—take good care of him, Jak." With that he hurried away to his work.

"There goes one of the outstanding medical scientists of our present age," said Jak, watching the retreating figure of the doctor. And then he turned to me. "William, I consider this one of the most profound moments of my life. Here you stand before me like a memory out of the past, your intelligence over ten thousand years old—what a staggering thought to me! Most people's appreciation of science is dulled in this age, but I appreciate the greatness of the Doctor's accomplishment. But come—I mustn't cogitate foolishly over such a scientific triumph. It is my duty now to introduce you to the governmental registrar of numerical names, and to the psychoanalytical examiner."

CHAPTER III

The New World

JAK led the way to a tube extending from the floor of the room to the ceiling. He pressed a button and an elliptical door slid back, revealing a small elevator. When we had entered, my new friend pressed a button and I suddenly felt as if I had taken on a great weight. Following what seemed like a half second, we emerged into what appeared to be a square, or park-like area in which gorgeous palms and mangroves spread waving fronds in the light breeze. But what instantly impressed me was the beautiful architecture of the buildings. Out of respect for my natural wonderment, Jak pointed out to me and explained the ultra-modern objects of my interest. The buildings were constructed of an alloy metal which was extremely strong and light in mass. It had made possible the graceful sweeping finish of the skyscrapers, which seemed to have an average height of twenty stories. Between the towering masses of metal stretched spidery suspension pathways, the sidewalks of which were moving, thus transporting pedestrians. Aerocars floated about in the air above the thoroughfares. Jak explained that invisible repulsion rays suspended them in space. All this time we had been transported along on a moving sidewalk until finally Jak indicated that we should enter a lone, tall building. Again we were whisked up many stories by the tube elevators to emerge into a spacious office. We approached a tall, angular man busy at what appeared to be a great typewriter, at least that was my impression of it.

"Hello, Alleron, I have a new person for you to record. He's been here for ten thousand years, but you have never got his name," said Jak, smiling.

"Oh, yes, this is the famous gentleman whose brain was kept alive for ten thousand years. Now, if you will sit in this chair for awhile we shall be through very quickly."

The thought came into my mind that he was not much impressed by the startling statement of my age; however, this thought was followed by a theory that the people of this ultra-modern age were highly developed in science, and hence, not to be surprised by advances in the science of the day. I sat down in the chair, surrounded by delicate looking apparatus that was meaningless to me. The recorder adjusted a long tube that arched over my head. Suddenly, it glowed dully, and crackled with a high pitched note, continuing so for five minutes during which the recorder tabulated the readings of various instruments arranged in a bank. He took the data and typed on the typing machine which in reality was a machine for photo-electrically recording the data on wire. When referred to, it was to be run through a revisualizing instrument which permitted one to see the particular datum desired. Jak explained that this method of filing took up very little room. Next, my examiner placed rings on my wrists and took accurate data on the state of health of my body, as Jak afterward told me. Finally, he handed me a stamped metallic disk.

"That is all, sir. Your name has been registered as William 55203NL484—it is on your stamp here. I found that you possess a large potential intelligence, and that health is excellent. I sincerely hope that you adjust yourself successfully to this world. And it will not be difficult with such wonderful assets."

Jak and I started for the tubes.

"Now, William, is it your desire to educate yourself further in knowledge? Don't be submerged by the natural contrast that you notice between your own memory of scientific development in your ancient day and of the present. Remember that your intelligence capacity has been increased ten-fold. Although you are lost at present, yet it will not be long until you find that you have the ability to develop your brain up to the average of today and maybe further."

Great Scott, I, try to learn the common knowledge of the day? The Self within me did the natural thing of giving in to the inferiority complex that enveloped it. Yet, reason took precedence, and I began to think logically. Why feel inferior? Intelligence is merely a matter of developing the brain, and if my capacity for development had been increased, why couldn't I at least try to improve my knowledge? A new, mental attitude began to assert itself within me. I began to

feel the desire, the thirst for knowledge. In the days of my studying in that dear, old college in the West I had been conscious of an enthusiasm in gaining knowledge, and of a proud feeling when I had mastered something difficult.

"Yes, Jak, I do feel that I should continue to improve myself. Ten thousand years ago I used to go out on a starry night, and gaze at the gleaming, scintillating suns far away. An unfathomable longing would grip my consciousness as I looked out across space, a feeling that engendered a deep and profound desire to delve into the secrets of Nature and understand them. That feeling still survives, and will be extant as long as I live."

"Ah, already he shows the ineffaceable spirit of the scientist," exclaimed my friend with fervor. "William, with such an attitude toward the world, I know that you are going to be a success, and I feel sure that in the hundreds of years of life ahead of us that we shall be bosom friends."

"Hundreds of years of life ahead of us! Do you mean that the average expectancy of life in this day is counted in hundreds of years, Jak?"

"Why, yes," he replied, as though asserting a perfectly consonant statement, and he continued to explain, "you see, we have means of controlling our health almost perfectly. From history I know that in the ancient days of medicine, the scientists continually battled disease germs that are now extinct, and have been for ages. We understand our bodies perfectly in regard to the food that is required and the effects of it. They are like any other mechanism that runs down eventually when not repaired."

CHAPTER IV.
The Disk

JAK stopped the elevator at a floor of the same building, we had first entered.

"Now, you will go through a psychoanalytical examination to determine what profession you are best suited for," said Jak, opening the door and stepping through it. "You were studying electricity in the ages that have gone by. I wonder if the examiner will find you suited to it?"

We passed on into a circular room where we were met by a small man who proved to be the government psychoanalyst. My name and age were recorded. He raised his eyebrows slightly at the mention of my great age, but did not inquire further. For an hour I was put through various tests, pertaining to my hearing, to my bodily resistivity, the number of cells in my brain, and my intelligence quotient. Finally, the spectacular test came when the room was darkened and a gleaming sphere above me began to expand and contract. Slowly, I became conscious of a low hum in my head that I tried to locate but failed. In the gloom I saw two smouldering eyes that drew my own so that they hurt. I blinked my eyes and looked again, and then noticed that the points of light had increased so that they revealed themselves as glowing tubes. By this time I was getting exhausted from the tiring tests, and my senses seemed to be tricking me at times. The lights were switched on and I relaxed. To my tired brain came intermittent scraps of conversation of the government scientist and his assistant.

"By the coluds of Venus, he has enough resistance. I burned out two phylons before I found the constant of five micrads per leucocyte."

"His memory curve surely turned out beautifully—almost a perfect hyperbola, just one percent in error."

"Yes, but from the way this integraph is functioning, he will never make a surgeon; he hasn't very good bodily coordination."

At last, the psychoanalyst approached me and laid various sheets with curves on them and also data sheets covered with rows of figures.

"We have found that you should study electricity. Your mind is of an analytical nature as shown here on this curve of successive crossplates of your brain in the area of the thalamencephalon. You have a mathematical tendency that should be cultivated further," and he went on similarly for several minutes, while I trailed along behind him and his erudite discussion of my mental powers and their relation to the study of electricity.

Before Jak and I left, the official told me that I was qualified to enter the University on the Disk.

"Jak, what did he mean by 'Disk' ?"

He looked at me quizzically a moment and then smiled.

"Ah, yes, it is quite natural for you to ask. It is possible that you have not learned this fact since your 'return' to the world: at this moment you and I are on a suspended disk-city eight thousand feet above the earth. A long way back it was found that people who flew constantly were as a general rule much healthier than those who were at the surface of the earth continuously. Purer air and absence of bacteria in the upper currents of atmosphere were conducive to the better health of the human race. Consequently, in time, huge disks were built miles in diameter with cities on them so that the entire population could derive the benefits of cleaner air. From then on science made great strides in eliminating disease."

"But what keeps us up?" I asked, astounded.

"It was discovered that a repulsion ray was given out when electrons of an atom were slightly pulled away from the nucleus and allowed to resume their normal position. This caused a very strong repulsion ray when carried on with a quantity of matter high in the Periodic Table."

We reached the level of the streets, and went out to a conveyor sidewalk or "escalon" as Jak called it. I marvelled at the surprising information of the disk-cities.

"I am taking you to the edge of this, our disk, so that you can see for yourself how it appears to be on a city in the air. You know, William, I am getting a lot of interest out of seeing your reaction to the comparatively commonplace things of today. It is rather refreshing."

"Do you know, Jak, there was a gentleman in my day by the name of Einstein who at the age of eighteen years propounded a theory that all things were relative.

He was a wise man, Jak, and his theory applies to something I have to say now. You are amused at me for my amazement at what are to you commonplace matters: I can remember reading of people having been away from the advances of society coming into what was a new world for them. One old fellow, seeing moving pictures for the first time, could not be convinced that there were no people behind the screen."

"Yes, I have come upon the name Einstein somewhere in my reading of old manuscripts. He was a—there you are, what a beautiful, clear view today!" and he pointed to some sparkling lakes that lay below like diamonds in the glow of the sun.

I gazed at the gorgeous midmorning landscape that lay stretched out before me. Hills, valleys, streams and meadows stood out very distinct in the freshness of the morning. I am a lover of Nature in all of its moods. The cool, crisp breeze of early day invigorated me, and toned up my skin. Birds on the wing swung up and down out in front of us, careening with the air currents to take advantage of them.

"I have been on disk cities for all of my life, William, and yet I am always fascinated by the view from them. I am conscious of an unnameable longing when I look at the horizon, the rim of the earth; I feel as if something within me, ancient, is crying out to go just beyond to explore and seek adventure."

CHAPTER V
A Social Error

I GLANCED at my friend to see if he were the same person I had judged him to be. It surprised me to hear him talking in such a vein, for he had always impressed me as being of a type that took Nature for granted, and who worshipped science.

He turned to me, a look of great distance dying out of his eyes.

"It is ten o'clock, William. I should like to have you come to my club today, for we have some interesting exhibits to present."

On the escalon we headed for the other edge of the disk. I watched the aerocars gliding about in the air above the city, and noted one in particular that was being piloted by a very charming young woman.

"We get off here," I heard Jak say.

Still gazing up at the aerocar, I started to leave the escalon. Of a sudden I came into contact with someone. Feeling somewhat guilty, and very apologetic, I lowered my eyes to look into beautiful pools of blue. The young girl in scarlet made my heart skip several beats.

"Why, ah—er—I beg your pardon," I stammered.

"Young man, you should be chastised; and looking at another woman, too! Oh, yes, I pardon you," and she gave me a radiant smile.

I came up to Jak who was grinning.

"Jak, er—ten thousand years seem not to have changed woman in any way. She is just as much a mystery to me now as she was in my early days."

"Well, they've kept pace with us men these thousands of years," he remarked drily.

We entered a tall building and went up twelve levels. Jak conducted me into a hall filled with many men, talking in groups, standing about a silver screen. He came upon a friend of his whom he introduced as Julian 11145MWM986.

"The topic of interest for today is on ancient warfare," proclaimed a gentleman standing on a dais. "We have here some old moving celluloid films that were sealed ten thousand years ago and kept in vaults. The pictures deal with a world holocaust of the year 1917. Please be seated and the pictures will begin."

The members stood in rows and behind them came up chairs out of the floor. I sat down, my heart pounding; I was soon to see the world of my natural days on earth! Soon, the moving pictures started with a scene of troops in column marching toward a dilapidated village. The men were tired and haggard-looking from long hours of fighting.

As the picture progressed, I became dimly conscious of having seen it some place else.

"Of course, you all know that this was one of the last great wars the world experienced. In the centuries that followed, the human mind gradually caught up with science, and warfare was finally abolished as being a disease. This picture illustrates clearly that man in that day was not so very far from his primeval ancestor in controlling his instincts. Throughout all the ages from that time on the greatest accomplishment of man has been the subduing of his inferior self and the elevation of his social inclinations for the betterment of the race. Notice this scene where the men are advancing with what they called euphemistically bayonets—really knives—on the ends of their guns. It shocks the social instincts of the age to see those men of the Dark Era of science plunging knives into the bodies of each other."

Now I recognized the picture. It was one of the greatest actual moving pictures of the world war, and had been shown to my military class at college. Instead of the thrill of seeing my old world, I experienced a revulsion. My mind was in a turmoil; what had Dr. Sine and Dr. Volor done to my brain besides developing the cells for expansion? I began to see my world of the past from the viewpoint of the modern man. Yes, environment is a great factor in a man's life; I found it influencing myself.

Beside me, Jak took out a small case from an inside pocket. On the surface of the mirror seemed to be written: "No. 43 arriving in atmosphere. Stand by." Jak told me in a low voice that a limited from Venus was arriving in a few minutes and that he had to be there to see it.

In the tubular elevators we dropped to the street level, and getting on a swift escalon, passed through the heart of the disk city to a wide area in the center of which was a huge cradle that Jak told me held the body of the flyer when it landed. My friend took me into a long, low building that I found to be the offices of the Interstellar Coordinated. I was impressed by the richness of the interior decorations. Pleasing color combinations met the eye at every glance. The people of this day knew well the psy-

chological significance of the effect of color on the retina of the eye. As I walked along, Jak was holding conversation with the chief of the landing crew through the pocket televisor, giving orders for the berthing of the interstellar flyer. I looked at him, and reflected upon his personality and those of all his colleagues, and its significance as a result of a harmonious atmosphere. Nowhere had I seen undue loss of temper; every individual seemed serenely happy as if in command of a mentality free from the toxic effects of suspicion, anger or covetousness. No wonder there was such efficiency in the social order. Evidently, in the past educators had finally made the people realize the value of self-control, and by an efficacious marriage code had produced a super-race of human beings.

We entered Jak's computing rooms.

"William, my chief instrument man, Lituus."

I met a man slightly taller than myself, of high forehead, and sparkling eyes, and pleasing personality.

"She's ninety miles now, but dropping rapidly on a parameter of a squared variable and a cubic function," he said to Jak, after acknowledging the introduction with a courteous bow of the head.

"Let us have a look at her," and Jak went to a mirror and twisted a knob. Instantly, there flashed on the ground glass screen the image of a beautiful, white cigar-shaped flyer on which was painted the number "43." Except for the glowing tubes at the end of the ship and rows of ports on the sides, it reminded me of the Zeppelins of my day.

"How long has it been on the way, Jak?" I ventured.

"Well, ordinarily, it would have been twenty-six days on the run, but since the recent unaccountable change in the orbit of the Leonids, it has been ten days over time dodging the swarm."

CHAPTER VI

Further Adventures

HE went over to another instrument, and got into communication with the commanding officer of the ship, assuring him that everything was in readiness to receive the big hulk of the space traveler.

Fifteen minutes later we ascended the landing platform to watch the hovering bird from out of space settle gently into the cradle. After a few minutes' wait, several massive doors opened in the side of the vessel, and passengers began to descend. Long conveyors were put into the ship through some of the larger hatches, and baggage began to flow from the huge monster down into freight rooms below the deck.

Jak approached a tired, sombre looking group of

"Greetings, gentlemen. Chief of Staff Georges couldn't be here to meet you today, so I was sent in his place. Everything is taken care of; you had better go immediately to the Violet room and refresh your systems. I can see the worries of this last trip have taken a great deal of your vitality."

They turned grateful faces to Jak, and thanked him many times over.

"That's the navigation staff of the ship, William. What a difficult task theirs is! You can't imagine the reaction you undergo when you leave the earth and venture into vast space. It is said that early experimenters went insane from the loneliness and terrible mystery of outer space. Things have happened out there that have puzzled scientists for years."

I looked at the bulging sides of the compact structure looming up beside us. What mysteries could it not reveal!

Down in Jak's private office off from the computing rooms, we sat and talked for a long time, discussing my future, philosophy, psychology and cultural subjects. I say "We discussed," but I might have said "I listened," for everything was so beyond me that I was lost. A steward brought in food and liquids.

"I know this will be quite new to you William; these tablets are condensed food in which is contained the essential values of vegetables, fruits, and nuts. However, the human stomach needs some bulk. This is a leaf from Venerian soil that has ferrous properties vital to the blood stream."

I surveyed the tray. No wonder I hadn't seen any rotund, obese people in this age! However, after consuming my part of the meal, I felt as if I had just eaten a wholesome old fashioned dinner.

In the late afternoon Jak took me to his suite of rooms in one of the beautiful skyscrapers. He offered himself as my roommate for as long as I wished. I was captivated by his taste in selecting little oddities. Queer little models of animals reposed in various parts of the apartments. I was informed that they were replicas of the fauna of Mars and Venus. Jak's love of the science of mathematics was reflected in his rooms. Here and there were lights in the form of a truncated pyramid, rich carpets woven in startling angles and colors, miniature models of various atoms, the electrons of which actually moved very slowly, depicting the Eternity of Matter.

"Well, William, let's have a peep at the day's events," and he sat down in a massive chair, along side of which was a right prism the top of which was covered with many pearly buttons. He pressed one, and a screen built in the wall opposite us glowed, resolving the light into the picture of the interior of a giant observatory on the surface of the earth. An announcer explained the objects of interest to us, pointing out highly complicated apparatus. Briefly, the fifty foot reflector focused the starlight on a battery of "electric eyes" that magnified it to greater detail and intensity. Next, we were given a view through the electric telescope.

"And here is Betelgeuse itself."

The announcer stopped talking to let the unseen radio public appreciate the profound, and spectacular sight of the flaming, young giant star. The picture blurred for a moment and then it cleared suddenly, the ball of raging, gigantic flames standing out in perspective in the room, so that I imagined that I could grasp it. The view changed to the planets of the star

of which, the announcer said, there were ten known. We saw two brilliant, scintillating oblate spheroids which were still in a molten state. For a great part of the evening we sat and looked out into the evening sky through the space televisor.

"And now, ladies and gentlemen, of the inviaible audience, Professor Cobb will present the most spectacular event of the celestial stage. In about one minute two dark bodies rushing toward each other in the region of the 'Coal Sack' will collide. Color screens will tone down the brilliancy of the flaming gases."

Hardly had he finished when the black mirror was lit up with a soundless flash, great curving arms of the flames reaching out beyond the limit of the screen. I went to the window and looked up into the sky. There, out on the ecliptic was a brilliant spot of light that apparently grew brighter as the moments passed.

I turned to call Jak. He was staring at the screen, a tragic expression on his countenance. Sensing something in the atmosphere, I approached him.

"Jak, old fellow, what's amiss?"

He motioned to the screen.

"You see there what happened to my father when a meteor struck his ship, and to think that all I could do was to sit at a screen like this and watch it happen!"

CHAPTER VII

Shirley

IN the days that followed I started my attempt to get a University education at the government institution. I was given more work at first than I thought I could handle, but somehow I got it done. Psychology played a very great part in the methods of instruction. In the big classrooms each student would recline in a chair and go to sleep through the effect of a certain vibrating energy, during which the process of instruction would take place. At other times we would see and listen to a professor who was probably several thousand miles away. Since I was studying electrical engineering, I received a great deal of practical instruction down in the engine rooms of the Disk, where was situated the huge apparatus for sustaining the weight of the city off the earth.

I was surprised to learn that the real, heavy, mechanical labor was performed by highly proficient automatons, that could answer any technical questions about the instruments and their readings, lift machinery, or do anything else of a dozen duties assigned them. I was fascinated by the mechanical men moving about doing their tasks, for they were the personification of man's genius.

As I found in my lectures, the source of energy for the electrical apparatus in the engine rooms was the electrical field about the sun. A long, slender pointer through the bottom of the disk collected the vibrations in the air and conducted them through a maze of tubes and rectifiers to four great tubes on the circumference of the disk. Here the electricity was stepped up billions of volts and let loose in a continual gigantic discharge through the long bulging tubes. At the ends of the latter the discharges caused the metal to emit a repulsion ray. My professors thought me rather dull, but it took me a very long time to understand the process.

Although the students worked hard, and with serious intent, still they found time—and they were encouraged by the teaching staff—to have recreation in dances and various social functions. They realized the value to their work by putting it aside once in a while and forgetting it so that they would be the fresher for doing so.

One evening when I came in, Jak was busy in conversation with his assistant back in the company offices. Soon, he ended and shut off the televisor.

"Hello, there, William, how's the engineer?"

"Not so bad. What are you doing tonight, Jak?"

"Why, I've heard about the university dance to be given this evening. So, that's where I'm going, and I presume you are, too?"

"Yes, I was going to ask you to go."

The dance was given in the ballroom atop one of the skyscrapers, the roof of which was covered in glass. We had taken two very charming girls from the University as companions for the evening. I had been to several dances before, and had learned the new graceful steps of the "Martian Ballet." During the evening I happened to see a friend from one of my classes.

"Good evening, William. How about a dance?"

"Oh, hello, Kant. A dance? Yes. Where shall you be?"

"Down near the orchestra. Thanks."

When my companion and I reached Kant at the beginning of the next dance, I found to my surprise that his feminine friend was the girl of the deep blue eyes. Introductions were made, and we moved off.

"William, I'm tired. Let's go out to the garden," said Shirley of the blue eyes.

I acquiesced, and we went to a secluded roof garden to sit under a brilliant-colored canopy, and enjoy the beautiful night. Just above the earth's rim floated the full, golden disc of the age old moon, while below the landscape was bathed in a golden glory of moon beams. An exotic, cool breeze disturbed the palms. Romance was in the very atmosphere. My mind ran back over the centuries to the moonlight nights that I had seen on that dear old Western college campus—strolling couples passing through the shadows of the college gardens—

"Oh, isn't it a wonderful evening, William?"

"Why—er—yes," and I came out of the past ten thousand years to be quite conscious of the young, vivacious woman near me.

"Will you tell me something of your past life of thousands of years ago?" she asked, settling herself comfortably in the corner of the divan.

"How did you know I was alive ten thousand years ago?" I requested, being rather surprised.

"Why you are a well-known character around the University. Everyone is interested in you." She colored slightly.

"Well, Shirley, I don't know where to begin. Perhaps if you ask me some questions, I'll know better how to tell you of my past life."

"Well, then, were young girls interested in science and art, as they are now?"

"There were a few in science, but more in art, however not as many as today."

While answering her question, I noticed a new expression in her eyes.

"Did you ever experience love?" she asked, quite serene, gazing up at a twinkling star, Sirius I believe it was.

"Yes, Shirley, she was a girl like you, resourceful, clever, and—beautiful!" The word was out. Confound my tongue!

She turned languid eyes on me, her lips parted, smiling. I never was a master of women; they always sensed their superiority over me. The turn of conversation left me helpless. To augment my confusion, Shirley was silent.

"Er—don't you think the dance is about over now?" I ventured, tentatively.

"Oh, no, not for ten minutes yet, and anyway, I'm not quite cool. Let's go over to the edge here and look at the street below."

We walked to the edge, and looked down upon a beautiful flood of colored lights that outlined the busy thoroughfares in striking hues.

"Oh, it looks as if there has been an accident over there on escalon 12," exclaimed Shirley.

I looked but failed to see it.

"Where?"

"Come here, and I'll point it out for you," she said in a tone one uses when speaking to a hopeless child. She took my head in her hands playfully and pointed it in the right direction. I felt a tingling sensation where her hands touched me.

"Oh, yes, I see it now." An escalon had snapped. I turned to smile at her. She was looking at me with shining eyes that reflected the blended colors from below. Her hands had taken hold of a lock of hair and were pressing it back.

"Shirley—" I began, my heart pounding, but I changed my amorous intentions.

"Yes." Her voice was soft, expectant.

"I believe we had better go back. Kant will think we've lost ourselves."

"Oh, he won't mind," she came back, a little peevishly, I thought.

Shirley was quiet all the way back to the ballroom. What had I done? Many times I had pondered upon remarks made by my friends that led me to think that I had violated some unwritten code of this far advanced age where my twentieth century ideas of ethics were incompatible. In the past I had been blest with the ability of blithely talking myself into tight corners, and it seemed now that Dr. Sine and Dr. Volor had not helped me at all to rid myself of the detriment.

CHAPTER VIII

William Triumphant

ONE day I was running a test on the polonium that flowed into the repulsion tubes to determine its quality.

Ron, a classmate, approached me.

"William will you take my place for a while at the 'auto' controls. I have to see Professor Luch personally for a few moments."

"All right, Ron."

"Thanks, a lot."

I went to the control room where the three other men were manipulating their mechanical men, doing various duties that could not be done very efficiently by automatic levers and relays. I sat before the mirror that represented the electric eye of the robot, and by various levers moved "No. 7" to take a look at the temperature of the electric furnace for repulsion tube No. 3. Everything was functioning perfectly. I continued to do routine work relative to the operation of the repulsion tube.

"Say, Havloe, did you hear about the great explorer, Ziffin, who just returned last night from a trip to Uranus?" The others carried on a conversation about the space adventurer who found evidences of a huge ship on Uranus that led him to believe that it came from some other solar system in the Universe.

As my robot straightened up from depositing some huge balance weights on the floor, I saw with horror that a polonium tube leading to the great discharger had snapped, pouring the precious Martian metal on the floor. Immediately, the dial on the wall above me showed that the great disk had already taken on a list, and was beginning to descend slightly.

"Increase your voltage and polonium flow, men, I'm shutting my discharger off. Polonium tube snapped!"

Knowing full well that the other repulsors could not stand the added strain indefinitely, I set No. 7 to work swiftly to close off the voltage and metal flow, and replace the broken tube. Conversation ceased; the others turning grim faces to their work, and working rapidly and surely. The list was corrected but still the disk continued to descend. With my heart pounding in my ears, it seemed an eternity to cut out the tube. Yet, it was delicate work and had to be done with extreme care. Even in this crucial moment I marveled at the delicacy with which the automaton handled the tube under my control. I watched metal hands carefully place the tube in its section. As soon as it was safe, the polonium began to flow again, and the discharger was turned on. Slowly, the instruments indicated that the descent of the disk was checked, and that it began to assume a normal elevation again after having fallen a thousand feet.

Ron came in with drawn face.

"By the rings of Saturn, what's happened, men!"

Havloe turned from his instrument, his face relaxing into a wan smile.

"Ron, you've never seen such cool, deliberate headwork as William has just displayed. I've heard the

professors doubting whether he would ever be able to equal the man of today, but surely he will stand high in their estimation now."

I was commended highly by my faculty for my good work. But the ones who were the most laudatory were the Doctors Sine and Volor. I sat in their laboratory.

"William, we are both proud of the great effort you have made to adjust yourself to this new world. You have succeeded very well. In our tests we have found that your mental capacity has increased even somewhat beyond what we hoped for. Your glory has come from the right use of your abilities, while our triumph has come from the successful experiment we performed on your brain. Your future as one of the successful citizens of this world is assured."

When I got up to Jak's room he congratulated me profusely.

"But, say, William, a young woman was just speaking to me over the televisor. She wants to see you personally."

"Who was she?"

"Do you remember a certain day that you 'needed to be chastised'?" he asked, a twinkle in his eye.

"Shirley!" I exclaimed. "When does she want to see me?"

"Gosh, you're clever!" he mimicked me, using the twentieth century expletive I had used but once. "Oh, she'd like to see you any time you will call on her."

That evening found me as Shirley's guest. She praised me for my quick work of the day, and told me how much I was lauded as well as the other men over the public mirrors of the news companies. We talked of various subjects of the moment.

"Look at the full moon, William."

As I looked, a slowly moving aerocar passed across its disk. Shirley put a hand to my hair, smoothing down a misplaced lock. I took her hand and drew her closer to me.

"Shirley, I—I love you!"

She smiled alluringly: "Well, my dear boy, you may be ten thousand years old, but I have loved you very much in spite of your mature years since the last University dance!"

I looked down at her comfortably settled in my arms, a great light dawning upon me: "Shirley, dear, this old world hasn't changed much after all. People act very nearly the same, only they are in a different environment."

THE END

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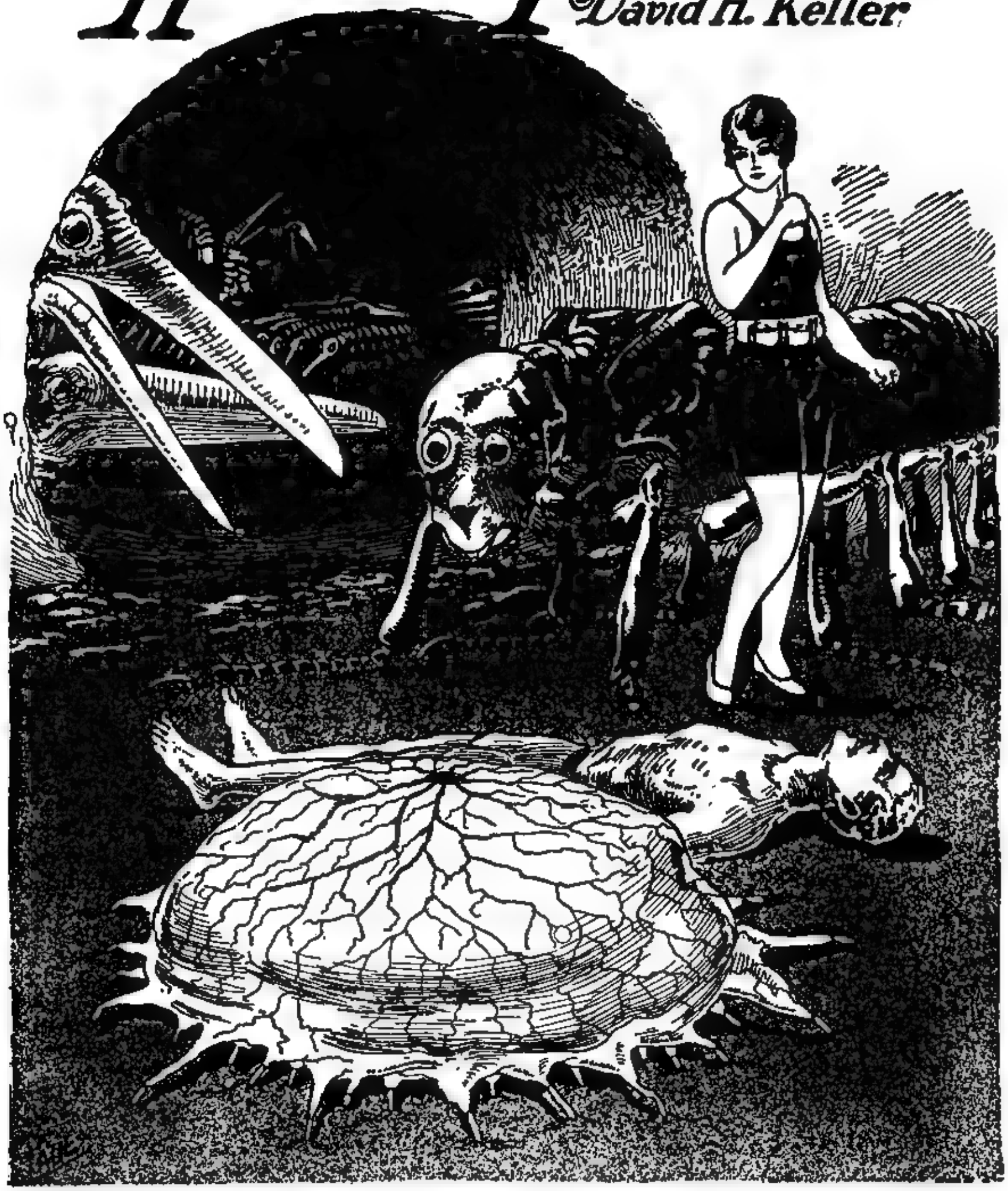
The Human Termites

by David H. Keller



Soon a giant worker came in carrying the body of Smithson. The worker laid the body on the sandy floor, its head near the Thing. Now as his body lay inert, Susanne closed her eyes and started to pray.

What Has Gone Before

HANS SOUDERMAN, a scientist, has spent the greater part of his life in a study of the termites, the white ants. He has devised apparatus to see into the termitary and to hear their sounds. He has made phonographic records of their sounds and finally arrived at an understanding of their language. From his studies he has learned that they plan the conquest of the world. He finds that each termitary has a Central Intelligence to which the termites are only blind slaves. He receives a warning from the Central Intelligence to leave. He returns to America and enlists the aid of Adam Fry, another scientist, to work out a possibility of saving the world. Termites attack their apartment and they decided to separate, Souderman to go north where the termites cannot follow. Fry enlists the aid of Bailey Bankerville, a multimillionaire, and his sister Suzanne, to work out the larger aspects of the problem. They decide that all nations are arranged as termite colonies and we as individuals are only blind termites to the national central intelligence which we must obey. Bankerville gets together a scientific expedition and they hire a ship to set off to Australia to study the termites. They just avoid being killed by a mob which suddenly attacks Bankerville's home. On the way they discover that the world is in a ferment. nations are uneasy, and the "Central Intelligence" of the United States is after them for criticising its stupidity. They disguise their vessel and finally anchor off an island where they plan to begin their work.

FOR the next week all in the expedition were actively engaged in their study of the termitaries and their inhabitants. A definite programme had been prepared and the prearranged plan was to first duplicate and check the correctness of all the previous studies. It was thought best to leave the language studies of Souderman go unchecked till all other knowledge of the insect life of the island had been studied.

It was soon determined that the island was singularly free from animal life. There was a startling absence of birds, and the smaller mammalia. Even the vegetation gave cause for comment. Certain trees grew in such orderly sequence that it almost seemed that they formed a cultivated forest. There was an unusual absence of smaller vegetation. This gave the entire island an appearance of a well-cared for city park. The termitaries were arranged in rows under the trees and faced exactly to the points of the compass, the broader part to the south and the narrow part to the north. These were called Compass or Magnetic Termitaries. The most peculiar feature of the colony houses on this island was the exact similarity in shape, size and material and the fact that they were located in long rows giving the appearance of streets lined on either side with houses. Between each termitary long clay tunnels formed safe and rapid means of communication.

DAVID H. KELLER, M.D.

It was Adam Fry who called attention to the fact that at the shore end of every street these thick tunnels ran down to the shore and into the water. This was perhaps the first of several startling features. Where did these underwater tunnels end? A diver was put to work on this problem and he followed one tunnel out for ninety feet from the shore and then it dipped to a depth that made it impossible for him to follow. At once several hypotheses presented themselves. Were the giant termitaries of different islands of this group connected? Were these tunnels used as means of communication? Or in this hot, arid country were these tunnels used to carry water to the termitary? David Livingstone, the noted African explorer, had observed the constant presence of moisture in the colony house and suggested that the insects had learned the chemistry of combining atmospheric oxygen with the hydrogen from their vegetable food and forming water. But was not the idea of running tunnels to a source of water and drawing it to their building a more logical method?

These tunnels caused considerable discussion at the staff meeting, especially when the diver reported that the ocean floor under the steamer was a meshwork of large tubes. However there was no way of knowing how old these were and it seemed a natural place to have them in the quiet of the harbor rather than out on or beyond the reef. The real importance of them was not realized till it was too late.

Not a single spot of the island showed the former presence of human habitation. There was nothing to suggest that it had ever been the home of mankind, and during the entire study of the island and its insect inhabitants no natives visited it from the other islands. The absence of birds, the freedom from the usual chattering of monkeys, the silence broken only by the surf breaking on the sand, became at times almost oppressive with its weight of suspense and mystery. There was one sound, however, that could always be heard above the breaking of the surf and that was the sound of thousands of millions of working termites harvesting the vegetation to put in their storerooms.

IN this installment, perhaps the best of the entire story, the author gives us a vivid yet accurate insight into termite life and their attending peculiarities as well as strange powers.

Fantastic as the story may appear to the average reader, it should be remembered that the author has been most careful not to overstate the possibilities of these dreadful insects. From a scientific standpoint, there is nothing at all wrong with the story. Quite the contrary, the author could have said a lot more and still have stayed within the bounds of the science of Entomology.

Few people realize the menace of insects to human life on this planet. Every student of insect life is continually sending out warnings about the insect menace, but little attention is paid to them as yet. At the present time, the United States Government spends annually $2,800,000 for the extermination of various insects and the damage done by such insects, even at the present time, reaches the staggering total of 2 billion Dollars per year. Yet man is seemingly powerless to cope with the ever rising insect power, and it is to be hoped that future generations will be successful in devising ways and means to fight this devastating scourge.

After some weeks of complete absence of unusual happenings the primary vigilance of the scientists relaxed. It seemed hard to keep constantly in mind the fact that these termites, so apparently endowed with simple instinct and nothing else, could possess the weird and occult powers described by Souderman. Even Bankerville and Fry, in spite of all efforts to do otherwise, began wondering whether the whole affair was not simply a scientific expedition instead of a challenge to ruling powers the greatness of whom could not even be imagined.

In the midst of this fancied security two of the sailors took a walk to the middle of the island on the 27th day of the scientific study. They never came back. Three sailors and the First Mate were sent after them and they never came back. Bankerville and Fry made a thorough exploration of the island taking three days to finish it and there was simply no trace of the six men. Then one of the entomologists disappeared. After that strict orders were given that no one should work by himself but always have another person with him to act as a guard. The first two to go out this way disappeared. This made a total loss of nine men. Bankerville decided that it would be best for those still left to remain on board ship till a decision had been arrived at concerning this loss. He, Susanne and Adam Fry went into a staff meeting that night. He opened the discussion.

"I cannot believe," he said, "that these men deliberately left the rest of us. The sailors might have but not the three scientists. Now if they did not leave deliberately they were forced to do so. There is nothing alive on the island except the plants and the termites. The only great forces we fear are the Supreme Powers of the various races and the Ruling Intelligence of the Giant Termites. I have seen no evidence that the power that drove us from New York is still harboring danger against us. That leaves the Giant Termite. How can those small insects capture nine of our men? They might have killed and eaten them but it seems to me that they would have left the skeletons. The men had firearms. They would have shot a warning if they had had notice of danger. What do you think of it, Adam?"

"I do not know. Perhaps we had better trust to your sister's intuition."

"Oh!" commented Susanne. "I am tired of that word. If we hit it you say it is just our intuition and if we fail you say a woman does not think and reason like a man. If you want to know what happened to those men why not get out that apparatus we had made after Souderman's blue prints and start talking to one of those Giant Termites. Ask them where the men are. You used to do a lot of talking about their wonderful intelligence but lately you have simply looked more and more on them as though they were just insects."

Adam Fry shook his head,

"I do not know whether we are ready to do that. Nine out of our force left a bad gap. When Souderman started to argue with them, he was forced to leave the country and Johanson was killed."

"Well, if you are afraid of them, what did you come for?"

"Now stop that line of talk, Sis," commanded Bankerville. "You know as well as I do that Adam is not a coward any more than I am. It is just a question as to method and waiting for the proper time to come."

"All right. You go ahead and talk and fiddle-faddle and see where it gets you. I guess you don't need me anymore, at least not for a while," and she started to leave the room.

Bankerville called after her,

"Susanne, you stay on this ship."

"Of course," she answered sarcastically. "First treat me like a child and then like a prisoner."

Bankerville turned to Adam Fry as his sister slammed the door.

"All women are like that."

"She is just upset tonight," replied Fry.

"No. I think she is going to explode. I have seen her before. Good for so long and then raises the Devil. You had better smoother her up and poother her down."

"That is not my job. What do you really think of her idea—starting to talk to them—getting down to brass tacks?"

"I really do not know. Let's sleep over it. Better hunt up that girl and talk a little to her. She thinks a lot of you."

"I should say she does. We have had nine conversations since I have met her. All at night and *everyone about those fool termites.*"

"Why don't you talk about something else?"

"She is not interested in anything else."

For a long time Bankerville laughed so that he could not speak. Finally he said:

"Get out and stay out before you kill me. As a society man you are certainly a wonderful bugologist."

Captured by Termites!

BUT Adam Fry could not find Susanne. The watch said that she had gone to her cabin. In reality she had, but at that very moment, swiming across the smooth water of the star lit harbor with regular and easy strokes. She had decided to slip to the island and solve for herself the mystery of the disappearance of the nine men.

In a short time she reached the shore and stood like a water nymph a beautiful piece of womanhood in the moonlight, while the water dripped from her closely fitting one piece bathing suit with its loose peculiar belt around her waist. Then she took a pair of canvas shoes from her belt, tied them on and ran singing down the main street of the termitary colony. She wandered over two miles down this avenue and then turned to the left. Due to her frequent turns she soon lost all sense of direction. It was beautifully clear, she had been awake for many hours, a strange sense of weariness overcame her and she decided to take a nap.

She did not know how long she slept but when she was finally awake she found that the stars had disappeared and it was black night. Stretching she found

her hands touching a smooth wall that covered her like a bowl. Instantly Susanne realized that during her sleep she had been made a prisoner.

In this peculiar position it is to her credit that she did not scream. She smiled instead. She had come to the island to solve, if she could, the mystery of the missing men. She felt that there was a definite connection between her captivity and their absence from the ship. Swiftly she patted the floor of her prison and the smooth circular walls and dome. This examination convinced her that, during her sleep, a million of busy working termites had built this prison over and around her. Realizing the uselessness of any other conduct she made herself comfortable on the sand and tried to go to sleep. Through the walls, from beneath her she heard the peculiar rasping sound of thousands and millions of termites at work—or were they talking to each other?

She had spent considerable time on the records of the termite language made by Souderman. She was able to talk the Command Language and also the higher language used as a means of intercommunication between the Central Intelligences of the Giant Termites. Listening to the sounds around her she thought she could distinguish certain words coming from the sand under her.

The words she imagined were so peculiarly fitted to her situation that she almost laughed. The word *dig, dig,* was frequently repeated. That was a termite command word that was well known. Then came the word *Queen.* That was a less frequent word on the phonograph records but at the same time a familiar one. The third word was odd. Did it mean down, or up, or in? Even while she was puzzling over this she started to drop down through the floor. No doubt now. That command had been, *Dig the Queen Down.*

That looks a little like intelligence, she said to herself. Adam never called me a Queen. Suddenly she thought of the picture of the Queen as described by Fry that night so many weeks ago. She shivered and for the first time knew what fear was. She slid down through a hole; a tunnel that had evidently been prepared long before that night. Then she suddenly struck the floor and stood up, shaking the sand out of her bathing suit and arranging her hair in a very feminine manner.

She no longer had to feel that she was in a tunnel. She was now able to see that she was in one. There was a mild luminosity from all parts of the tunnel, walls, floor and roof. It was a cold light and even in her strange position Susanne wondered if these termites had solved the problem of a cold, heatless light. She felt an impulse to go forward and analyzing that impulse she decided that it was due to the fact that far ahead in the tunnel there was a more brilliant light. Was she like a moth to be attracted to the flame?

At any rate she went on. There was no signs of life, nothing to force her in any way, she simply felt a desire to go on. As she walked she saw that there were lateral tunnels, and in many instances light came up from deep pits in the earth which seemed to be the same size and of the same perfect construction as the tunnel she was walking in. She wondered what would happen if she fell down one of these but, at the same time she had no fear of doing so. It is a beautiful example of her peculiar personality that just as soon as she realized that she was really doing what she came to the island to do that she ceased to be afraid. Fear came later but in these first hours there was simply a profound sense of satisfaction in the accomplishment of her desire, the attainment of her wish. She wanted to find what had happened to the missing men.

And finally she came to the end of the tunnel. There opened in front of her a large room. It was a perfect circle and was walled and ceilinged by a perfect hemisphere of a dome. From all sides a light came with no waverings or flickering. It was the same kind of light that came from the sides of the tunnel but now it was colored, the colors changing from one of the prismatic colors to another every few minutes. Susanne simply stood looking around the room. It was not for a moment to be thought she did not instantly see the Thing in the middle of the room; she simply tried to pretend to herself that she did not see it. It may be that the reason for her pretending not to see it was due to the fact that she was not able to identify it with any of the things that she had ever seen before. And yet, she felt without knowing that she was doing so, that this Thing she saw on the floor was the thing that the expedition had come to find.

The Giant Termite

IT was just a mass, shapeless, formless, constantly moving and yet never leaving the center of the room. White, apparently without bone, skin or muscle; bloodless, sightless, without any of the external evidences of possessing any of the special senses this mass Thing simply lay on the floor. As Susanne looked closer she saw that little earthen tubes ran from under it to the sides of the room and disappeared. She wondered whether these were channels for the working termites to run through or whether they carried water and food to the thing on the floor. Without any self argument she at once took it for granted that this was one of the Central Intelligences of a Giant Termite. This was the ruler of the termitary, the ego, the brains, the soul of the animal. Certainly nothing to be afraid of; a weak, albuminous, semi-gelatinous mass of highly organized nerve cells; that was all this thing was. And a cautery, a small charge of dynamite, a sprinkling with acid would send this million-year old Thing to its prehistoric fathers.

With light step she walked around it. The more she saw of it the more she pitied it. If only it had a skull, a crock of bones to protect it from injury. No wonder it had to hide in the earth, yards below the surface. And this was the thing that Souderman was afraid of? Pshaw!

She wanted to punch it with her fore-finger. There was a desire to break one of the tubes open and find if it contained water, or insects or air. Finally she decided to speak to it. She wanted to ask it where the

nine men were. Hastily reviewing her knowledge of the Superior language of the Giant Termites, she said,

"Good evening. I have come to see you."

And from somewhere, somehow she heard or thought she heard, which was the same thing, a voice reply,

"Good evening. Please do not trouble yourself to talk in the Termite tongue. I can speak English perfectly, and I know our conversation will be more interesting if you speak in your own language.

"You speak English?"

"Certainly, I speak everything. Spoken language, as you no doubt know is simply the expediency of the childhood of life. We Termites think. I am not really talking to you now but I am thinking to you. That should seem plain to you. I think things; they are thoughts; they come to you through the ether and because of your childishness, because of the ignorance of your human species, you cannot appreciate these thoughts without translating them into words. As you speak English you hear English. If you were French or Russian or Chinese you would still understand me but in words of your own language. As a matter of fact you are so accustomed to associate thought and speech with sound that just as soon as you receive a thought you think that you are hearing it.

"In reality there is nothing save a vibration reaching your consciousness. The same thing is true of all perceptions. You think that you see things because you have eyes. I have no eyes and yet you vibrate in a very pleasing way to me. I have no nostrils and yet there is a very pleasant sensation reaching me which if I had nostrils I would no doubt think was a delicious feminine odor. With these few introductory remarks I feel that we are now ready to begin our conversation. I am sure that you want to. I knew how you felt on board the ship and, if you will pardon the egotism, I suggested to you that you visit me. The suggestion worked out very nicely. I think that in a short time we will be in perfect *rapport*, complete harmony with each other."

"So you are the Controlling Power of a termitary?"

"You can consider me as such. In fact I am a little more than that. I have a sort of a command over the other Central Powers on this island. That is because I was the first one here and all the others are a little younger than I am. Of course we all know about the same things but I was first."

Susanne sat down on the sandy floor. She looked at the Thing. She felt a little like Alice in Wonderland or the Jack that climbed the bean stalk.

"The first thing I really want to know is this. What did you do with our nine men?"

"Easily answered, my dear young lady. In fact I will show them to you. We are rather well acquainted with the natives around here but our knowledge of white men was a little incomplete. We wanted to fill in the gaps before we started northward and so I was able to induce your brother to come here. Naturally we could not go to him, but he could come to us. The personnel of the ship was charmingly suited to our purpose. You see that this island is simply an enormous laboratory for the study of the problems connected with our world conquest. Various ideas are sent to us from the termitaries all over the hot world and we work those ideas out in our studies and see which of them are worth while. So the best termite minds are on this island. We wanted to study the white man. We thought that anatomically he was like the native black but we were not sure. So we took those sailors and did some beautiful dissections. Please do not shiver; they were thoroughly insensible to pain before our workers started to eat away the parts of their bodies not suited to their purpose. Now we have a complete skeleton, a perfect vascular system, a nervous system complete with nothing else from that man, a respiratory system, and digestive apparatus. Each complete system was very carefully dissected out and then the part we wanted to save covered by our glass made from the termite discharge. So the sailors are perfectly useless to you though they form a very valuable addition to our anatomical museum. Would you like to see them?"

"No," answered Susanne Bankerville. "I am satisfied that you are lying to me and yet at the same time you may be telling the truth. If the men are dead they cannot be helped and if they are alive they are safe. How about the three scientists?"

"Still alive. All three are engaged in teaching groups of our Master Minds all over the world. Since we depend on wave transmission of thought it is just as easy for them to lecture to all the Master Termites at one time as it would be to talk to a few. Some of their ideas are interesting and while none of them are new, still we wanted to be satisfied as to the psychology of the human mind before we started to destroy it."

"Are they lecturing willingly?"

"Now they are, but not at first. They thought that it was disloyal to your brother and that quaint organism called Fry. I had the workers eat off all their clothing and then used a few of the warrior ants in proper places and after a few minutes they agreed to lecture on their specialities. Of course we are going to end by making a careful study of their nervous systems but for the present they are alive and doing fairly well."

"Can I see them?"

"No. Not as you want to but I can show you a mental picture of them, through an apparatus that your television is an infantile attempt to imitate. Would you like to see them?"

"Not now. Can you show me Adam Fry?"

"Certainly. All you have to do is to try and look into space. I will give you the necessary help but you are so psychic that you can do it very well. You could have done it a long time ago if you had only thought you could."

Susanne closed her eyes. And then she saw Adam ——. He was on his knees by his bed and in his hands was a picture of a woman. His lips were moving.

The woman, in the bowl-like cave, with the Thing on the floor in front of her was overcome with curiosity. She said to herself silently, "If I can see him I

can hear him," and the words came to her from the man's lips.

"Oh God! Wherever and whatever you are help me to take care of little Susanne and may the two of us work in love for the benefit and safety of our race. Amen."

"Beautiful, childlike simplicity, is it not?" asked the Thing on the floor.

"I think it is wonderful," answered Susanne. "I am proud to have as fine a man as Adam Fry love me."

CHAPTER VIII

The Termite Speaks

THE truth was that up to that minute she had never known that he loved her or that she would be glad if he did. It was an idea that had just entered her consciousness. However, once it was there, she realized that it had been there from the first minute she saw the man that morning at the breakfast table. Now, with this wonderful knowledge gained, never to be lost sight of, she felt more than ever the desire to learn all she could about this termite underworld. Every bit of information would add to the amount necessary to accomplish the real aim of the expedition. Once again she looked at the Thing on the floor.

"What did you want me here for?" she asked.

"That needs a long answer," the white mass seemed to reply. "Make yourself comfortable and listen to me. I am sure that by the time I finish you will have a very clear idea of why you are our guest. Some years ago we decided that we had to conquer the world to make it safe for democracy. That is a peculiar idea, is it not? I understand one of your former Presidents used the same thought. We Giant Termites have had during the last hundred million years a rather hard time of it. Only by the constant unrelaxing use of every bit of our intelligence have we been able to survive. There were dangers from the elements, from animals and especially from the black ant. However, we managed to keep on. Our contemporaries all failed to live. The cockroach, much younger than we, has been able to adapt himself to new surroundings; but you realize there is no comparison between him and the Giant Termite. Finally there came man; he was from first to last a poor, inefficient creature having to call on science and invention for the simplest necessities of life which we millions of years ago incorporated into our bodies. However, during the last few hundred years he has become rather proud and several times even went so far as to blast entire fields occupied by our surface-termitaries and then plough those fields level. Of course he found that he could not raise anything. The ground was fertile enough but our workers ate the crop as fast as it grew. We became irritated; and as far back as 1840 we decided to claim this earth. It really was ours to start with. The very idea of selling it and pretending that they owned it!

"The first thing to do was to organize into a harmonious whole. That was easy. In a few weeks we had a perfect system of intercommunication existing between every Giant Termite in the whole world. We started a spy system. This laboratory was organized. We made a survey of the situation and found that we had everything we needed except size and locomotion. The size did not really bother us but we wanted to work fast when we started and we felt that if our soldiers could be the same size or a little larger than man then we could work better. If we could develop a race of super-workers, giant soldiers, retain all the efficiency of our little termites and yet have the size, then a great deal could be accomplished. Of course you know, that is a silly question, for I know that you know the fact that these soldiers and workers and even the sexual types like the Queen and her husband are all cells of my body. They are cells just like your blood corpuscles, but we have been able to make them more efficient by giving them a greater liberty and larger field of action. At the same time they are absolutely under our control. Our problem was to grow large numbers, millions and billions of these giant soldiers. Of course we had to grow a similar number of workers because all these soldiers had to be fed.

"I suppose that no variety of life that has ever existed on this earth knows as much about life as we do. I mean the real understanding of what life really is and how to control it. We have been able in the course of those years of the past to learn a number of things that so far man is only beginning to dream of. If you knew the real details of the physiology and anatomy of the Giant Termite you would understand that my statement is no idle boast. We manufacture all the cells that we need for replacement purposes from one kind of egg. We take that egg and by giving different kinds of food, we make as many different kinds of cells as we have use for. We vary the size, the sex, the shape and even the desire to perform work. The entire generative system is completely under the control of the Ego, Central Intelligence, Soul, Mind or whatever you want to call me, the Thing you are listening to. We have subordinated the male of this cell production to a very minor part. The female we have made of enormous size. We have played with our cells till we are able to do anything with them that we wish. We have no disease; mutiny of our cells is an unknown thing. Do you think we would let a group of cells destroy us as the cancer and sarcoma cells destroy you humans? Not at all.

"Each period of thousands and millions of years we knew more about our cells. I suppose it was this complete knowledge that gave us the ability to work so quickly when we decided to make new types. We had on this and many other islands in this group a large number of natives. We captured them and used them for breeding our new class of giant workers and warriors. Of course the length of time needed by the human female to produce one offspring made it necessary for us to devise new methods; even the production of one ovum a month was too slow, especially compared with our Queen Termites which produce an egg every second without a stop. So we took a number of native women and experimented with them. We

felt that there was no reason why they should just have two ovaries when there was so much vacant space in their bodies. In a very short time we had some native women that had fifty and in one case seventy-nine ovarian transplants doing nicely in their abdomens. Transplants do not work well with your primitive methods of surgery but we know so much more than you do about surgery that we had no trouble and by speeding up the physiological action we obtained a seed every day from each ovary. Of course a seed a day was good but finally, and I believe it was just a year before we did that, we had women that were producing a seed every minute from each of their ovaries, and of course as they did that day and night it was rather fair.

"Our specially trained embryological workers had no trouble maturing the eggs and thus in the course of years we have been able to collect millions of rather remarkable workers and soldiers. As they, like all of our workers, live on in direct proportion to the care we take of them and the food we give them, we have them in reserve, accumulating, you might say, for the Great Day to arrive. I believe that by this time we must have several billion of them in the various barracks of our colonies all over the world. At first we were somewhat puzzled as to what shape we would make them. You see, they had to, in a way, resemble the human form, but as we fertilized all the human female eggs with termite male elements and then added to the variations by changing the food, we were able to make all kinds of startling shapes. Our favorite warrior now is about twenty feet long with six pairs of legs and a scissor-like jaw five feet long. With this he can, at one bite cut through and break a man's body. Our idea was to end the conquest as soon as possible by making war a horrible thing.

"For example, we have a special type of soldier that takes a great pleasure in mutilating the body of the human. When we capture a city this type will be turned loose. After a few countries have been treated in this way the population will gladly go and drown themselves. That will give us less work to do. Some of our soldiers will act just as shock troops. We want them to be blown to pieces as soon as possible. They will poison the entire country with their decaying bodies. Well, you are not interested in such accounts. What you want to know is the part you are going to play."

What Susanne Saw

SUSANNE looked rather serious, but finally she laughed.

"I thought for a while that you were telling me the truth but now I know that your entire story is a fabrication of lies. I know a little about life myself and I know that there is a vast difference between taking the egg of an insect and hatching it and taking the egg of a placental animal and raising it to extra-uterine maturity. I think that your story of taking these negro women and planting so many ovaries in them and then taking the eggs from those ovaries and raising new kinds of giant warriors and workers is all a lie. It is scientifically an impossibility."

"And you think that my story is not true?"

"That is what I think."

"Suppose I show you?"

"That would be different."

"Well, you walk around here a while. I will give you a termite guide. He is really a superior, crossed, termite human. He will take you around and when he is through will bring you back. You can ride on his back if you want to. Of course he cannot talk to you but he understands our command language, so you can have him take you anywhere you wish—only come back, come back and hear the rest of the story."

From a side opening a termite came. That is, he looked a little like a working termite only he was twelve feet long, had six pairs of legs and a face that was pathetically human. Susanne walked around him twice, carefully examining him. Then she jumped on his back, made herself comfortable and told him to travel.

"I want you first to take me to the place where the human queens are where the eggs are laid."

There was no response except that the horse, guide, human termite, or whatever he might be called, started off at a brisk walk. Some miles of tunnels were traversed. At intervals other workers were passed, and Susanne saw they were all of the new type produced by the union of native human and termite stocks. Finally they came to a large, low ceilinged room. Hundreds of low tables filled this space, arranged in regular rows. On each table was a living form. Up the legs of each table and even running into the bodies of these travesties of nature were the long earthen like tunnels, the same in size as had entered the Thing Susanne had been talking to. Susanne, with difficulty overcoming her nausea, jumped off her guide and went close to one of the tables. There was no doubt that what was on the table had once been a woman. She was still alive, speechless but with a look of deadly terror in her eyes. Her entire body was swollen, distended, enormous and entering it were over fifty of the peculiar earthen tunnels. Leaving her guide, the puzzled woman walked down between long rows of similar distortions. Finally she reached the last table. On this a young negress seemed to sleep. Her nude body showed youth, and perfect health. All around the table she slept on was the greatest activity. Small termites were busy building tunnels up to the top of the table. Other termites were actually eating openings into her abdomen. In one place a tunnel was being built into one of the openings. There was no hemorrhage, no pain. If this was insect surgery, then it was far in advance of human methods.

As in a dream Susanne heard a voice saying to her,

"This is our newest woman. Our surgeons are now running fifty tubes into her. Inside her abdomen, at the end of each tube will be placed an ovarian transplant. As soon as she starts to form eggs these will be taken down the tube to our uterine nurseries. Suppose you tell your guide to take you there."

Trembling, Susanne walked back to her guide. In walking past the hundreds of women who had been

turned into vast ovaries, she tried not to look at them. Once on top the guide and the order given, she shut her eyes and tried to stop thinking. Down the long corridors they went and she thought that she could not live if she went on thinking. She simply had to stop. Finally the guide came to a halt and opening her eyes she found herself in another enormous chamber. Here there were workers of all sizes. The brilliant illumination of the vast room made every detail distinct. At one side was a black sheet of wall with thousands of little openings. At each opening workers waited. Now and then a worker took something between his jaws and ran down the smooth roads between the rows of holes. There were long tables in this room about the same size as in the first room. These seemed to be covered with a red, flesh-like substance. She saw that the workers running down the black wall ran over on this red substance and seemed to drop something. Other workers with peculiarly shaped heads were spraying a substance over the mass.

She walked down the room. On some of the tables worm-like shapes were twisting and squirming as though testing out a new gained power of motion. Some of these shapes were ten inches long. None were over that. Susanne started to talk to herself.

"Too much for me," she said. "I am afraid that I am not a good enough scientist to figure it all out."

"It really is very simple," said the familiar voice. "You saw the ovi-tunnels entering the female bodies. As soon as an egg is formed it is seized by a worker and carried down the tunnel. The other end of the tunnel is one of those little holes in the black wall. As soon as an egg is brought to the end of the tunnel it is taken by another worker and carried to one of the tables where it is placed on our uterinal compound. There it is fertilized by male termites who are specially selected. The egg starts to grow and as soon as it is ten inches long it is taken to the various nurseries, of which there are seven different kinds and in each nursery different food is given to produce a varied form of slave. As soon as maturity is reached they are taken to the barracks and placed in a long row. From that time on they stand there, waiting for the command to produce activity. They are fed just enough to continue life. Very simple, now that it is all explained, is it not?"

Susanne almost ran back to the guide. Jumping on his back, she said,

"Take me to the barracks of the fighters."

The insect animal started off at his usual slow pace.

The trembling girl grabbed a part of his back with both hands,

"Quick," she said, "Get there quick. I am in a hurry."

And at that she was nearly thrown off. The animal went tearing through the tunnels, skidding around right-angled corners and finally came to an abrupt stop that threw Susanne headlong off into the soft sandy floor. A peculiar odor at once attracted her attention. In some way it resembled that of the sweating negro. There was not as much light in this cavern as in the others but even at that there was enough to see. Stretching into what seemed infinity were long rows of enormous insects ten, fifteen or twenty feet long. They stood side by side like soldiers in a row. They swayed from side to side like elephants and from the mass came a soft grinding as they slowly opened and shut their five foot sciasor-like jaws. Up and down in front of each row walked guards. No one seemed to pay any attention to the white woman looking at them. She went back to the guide and resumed her seat.

"I want you to take me around this barracks. I want to see all these soldiers."

A Place of Horror

THEY slowly passed millions of these soldiers. At least it seemed like that many. Only in one place was there any trouble. As she neared one of the enormous freaks of cross-breeding he reared on his hind legs and jumped forward at her. Quick as he was, the guards were faster. In a second he was fastened to the ground while around and on him was a mass of termite officers who promptly cut him to pieces. As he was dying he started to cry, "Ma—Ma—Ma—Ma. . ."

And then for the first time the New York society girl lost her courage and covering her face with her hand shook with grief,

"Oh, Thou Creator of All Things. Do You know that this is going on? This horror was partly created from the flesh of a woman. That woman he never knew—all through his life he has been fashioned and governed by the insect paternity, and yet in the hour of death, something impells him to call on his Mother as all children do when they are in trouble and from his five-foot mouth comes the cry for help to the only one in his life who would have loved him and he says 'Ma-ma.' God! Do You know this is going on?"

"Take me to where those scientists are lecturing," she commanded. "Unless I see someone human soon I will go mad in this Doré chamber of horrors." So finally she was back in the quiet chamber where the Central Intelligence awaited her.

"You wanted to see the scientists and hear them lecture," he said. "I do not think that is wise. I want to talk to you first. I am sure that you are convinced by this time that all that I told you is true. All over the earth our armies are waiting the command to go forth and conquer the world and make it a safe place for the Giant Termites. We have been waiting for just one thing and that is a form of locomotion for the Central Rulers, the Intellects that you call a THING."

"I see what you mean," answered Susanne, "but first tell me one thing. What am I anyway in the order of life? We talked about a uniform pattern of life. If there is such a thing, how does man compare to the Termite? Has he a Ruling Intelligence, or is he the ruling intelligence?"

"That is a good question. I believe that man is simply like one of the little termites that with us take the place of the human blood cell. Millions of such men, grouped together in a nation or a race form one

animal, a Giant Termite, as it were and over that animal a Central Intelligence rules."

"And that Ruler makes nations act the way they do. Was it that ruler that made Germany go amuck years ago? Was it that kind of ruler that made the army of Attila, and millions of Tamerlane ravage the world?"

"I believe so. Those Intellects are always trying to get the best of each other."

"Are they really intelligent?"

"No. I think that they are stupid. Imbeciles compared to us."

"And I suppose the more they fight among themselves the happier you are?"

"Certainly. The more of each other they kill the less work for us when the day comes."

"Where do these Intellects live? If I wanted to go and talk to the Controlling Power of the United States, like I am talking to you, where would I find Him?"

"The last I heard of him he was in an inaccessible cave in the Rocky Mountains."

"Does he look something like you?"

"I suppose so. I really do not know. He is so inferior to me I never tried to see him."

"But you could talk to him?"

"Certainly. So could you if you could tune in on his wave lengths."

Susanne pressed her lips together and twisted and untwisted her fingers. Suddenly she whispered.

"I believe that I understand it now. You can go on now with your part."

"You mean our part. We are all ready to start to conquer the earth but we feel that our workers and soldiers must have us with them to intelligently direct them. Now it is an interesting fact that while our bodies can move long distances if we provide tunnels for them to move through, the mass that our ego is in is to a great extent very stationary. We can move by the forming of new termitaries but once a termitary is formed it stays right where it is built. With the billions of giant workers and soldiers at our command we need not worry about the stability of our colony houses. We can leave the little termites out of consideration. They are really not necessary to our Central Intelligences so far as the proposed war is concerned.

"Do you know how we form new colonies? Simple matter. We send out tunnels and the workers go to the end of those tunnels and build a new termitary. When it is all finished, I cut off a little piece of the thing you see in front of you and that is carried to the new colony house. It has all of my intelligence, all of my memories. Under feeding it at once grows to adult size. Well, we could spread over the whole world that way but it is a slow process, and when we start we want to finish quick. We need locomotion. That problem has been a constant one and till lately an unsolved one. We have never thought much of the human being, but the more we studied him the more we envied him his power to get over the ground. If he had our intelligence he would be ruling over Mars and Venus by this time.

"Now how were we to get our brains into your bodies? We experimented on the natives but they are such a low type that we did not like the results, so we simply killed and ate the products of our experimental laboratories. We thought of securing a number of white men and replacing their brains with our bodies, with the THING you see before you. We did that in a few cases and that was not satisfactory. Yet we wanted to learn a satisfactory way of locomotion, and we also wanted to make in a short time a great number of Central Rulers. We have never been very much interested in the human form of propagation, in fact it seems rather crude to us, but we felt that we might speed it up, so a woman like yourself could lay an egg every hour at least, and if she was mated to a male those eggs would grow under our intensive feeding into a six-foot being in about a month.

"Now here was my idea. I am sure you will agree with me that it is very original and clever. We have been working on those scientists—two of them died but we had perfect success with Smithson, the photographer. His nervous system was easier to work with than the others. To put the matter briefly our surgeon termites have removed his brain. He lives on, but of course is without intelligence. Now they will bring him in here and place Me, this Thing you see before you, inside his skull. By making the proper connections and being fed with my accustomed food, I think that I can manage rather well in his skull. Now I will be able to walk, or rather have Smithson walk at my command and carry me. When he shows signs of decay I will simply transfer myself to a new human body. We will feed you in such a way that you will ovulate every hour instead of once a month. You are rather intelligent and the children born of our union, or rather the children that are developed from the eggs born of our union will be entirely different from those monstrosities you have just seen. They will look a little like you and a little like Smithson, but inside their heads will be parts of Me. Now by this means we will be able to form a means of locomotion."

"So you want to marry me?" stammered the blanched woman.

"I suppose you would call it that. I want to use your body as an experimental station. Of course, I could not do anything to you with this mass of potential protoplasm, but once I had control of Smithson's body, the rest is easy."

"Do you love me?"

The Thing seemed to laugh,

"That is a word we do not know. We have often wondered as to just what it means in your peculiar language. I do not believe the Giant Termite ever knew the word. The only thing we live for is greater ability to attain our own desires. Love. Why, that is meaningless to us."

"Go ahead with the experiment," whispered Susanne. "I am just as ready as I ever will be."

CHAPTER IX

Susanne Escapes

THE Thing whistled in a peculiar manner and then they waited. Soon a giant worker came in carrying the body of Smithson. The woman had seen him daily aboard ship but had paid no particular attention to him. He was a capable photographer but as a man was too primitive in his masculinity to please the sensitive daughter of a great Bankerville. Now as his muscled body lay inert and nude over the trunk of the worker Susanne closed her eyes and started to pray. The worker laid the body on the sandy floor, the head near the Thing on the floor, the lifeless face turned looking with sightless eyes. Then the worker left. The Thing was on the floor; the brainless photographer on the sand near It. About five feet away stood Susanne and near her was the Guide-Termite who had carried her around the caverns of the Termite Colony. Susanne looked at this peculiar insect animal, and remembered that to a little extent it was human. It was distorted, twisted, a pitiful giant, malformed monstrosity, but in there, somewhere, was a part of the human, could she say a spark of the Divine?

"And now," said the voice softly, "comes the great adventure. I can live without my tubes for several hours. Before the time is up I hope to establish satisfactory protoplasmic relation with this new body that is going to carry me around so proudly and with your help form a new species of beings. The Central Intelligences, of which I am one of the oldest, are rather proud of our ability to separate from our tubes, but we do not do it without due necessity. We feel that it is a procedure bordering on the occult that should only be used with the greatest caution. So I am going to enter Smithson. In doing so I will break my tubes. You will not see me again, but of course I will be in there, directing Smithson's actions. As I understand the habits of human animals, he will make you a good lover. Our surgical gynaecologists will do some work on you, but I have given orders that they shall not change your shape. You and Smithson and, incidentally, this thing in his skull will live in a Royal Chamber. Now watch carefully because what you are going to see has never been seen by any woman, white or black."

The Thing stretched a pseudopod of protoplasm towards Smithson's face. Susanne saw it slowly slide over the floor, and then a little part of it started to go up Smithson's right nostril. It just seemed to slide up and as it slid the bulk of the mass outside the face grew less. There was now and then a little crack, and the woman saw that the earthen tubes were breaking loose from the protoplasm. Frightened little working termites ran out of the broken ends and started to repair the tubes. At last just a string of protoplasm hung out of the nostril, like a white worm. That disappeared, and then nothing was left save the body of Smithson on the floor. And that body began to slowly move, the head turned from side to side in a rhythmic nystagmic tremor. The eyes opened. They were Smithson's eyes, but out of them peered the soul of the Thing that had slipped inside his skull pan. There was a harsh, materialistic gleam in those eyes and then the voice spoke, either from Smithson's mouth or from the Thing in the skull.

"Hullo, Susanne Bankerville. No more high hatting from you, my dear. We will just go to the Royal Chamber and start life on the new scale. Odd, the way life plays with us, but from now on, little Susanne, you are going to be my Termite Queen."

Susanne had done all of her thinking hours before. She had back of her a long line of human intellects who were accustomed to face emergencies and handle them to an end of victory. She knew, even while planning to leave the ship that she was going to face peril. What that peril was, how it would affect her, she had no idea, but she realized that this was no light adventure to be plunged into without due thought. Since she had seen Adam Fry praying she was more anxious than ever to save the world, especially that little piece of the world from the menace of the Termites. She patted the Guide Insect on his partly human head.

"Turn your face to that opening," she commanded.

Then she walked near the body of Smithson. He was smiling now and trying to raise himself to a sitting position. His movements were clumsy as though the Thing inside had not become familiar with the motor control of the new Colony House he had deliberately sought a home in. Smithson grinned,

"So the dainty Susanne and I will live in the Royal Chambers. We don't know what love is because we have a Termite in our skull."

Then the dome-shaped room rocked. Explosion after explosion filled the air. Above all came a moaning cry, the sound of a worried soul in distress. Then all was quiet. Susanne stood facing Smithson and in her hand was a smoking automatic revolver taken from the peculiar belt around her waist. She had literally blown Smithson's head to pieces. Hastily she replaced the empty cartridges with a fresh clip, put it back in the holster under the belt of her bathing suit and jumped on the back of the guide-insect. She lay flat on his back, holding on with fingers and toes and then she said:

"On and on. Go on and break through every wall and take me to the sea shore."

From then on life was a curious jumble to Susanne. The insect-animal with a little of the man in him obeyed. He knew nothing else. So on he went. Nothing stopped him. One soldier, gigantic and threatening, tried to cut her steed in two. Only a tip of the tail and one leg were caught. Near the surface gigantic eyes loomed out of a dark sentry box and caught the dazed girl's bathing suit. She pulled out her revolver and emptied it into those eyes and cried again, "On, On!!" to her crippled steed. Her suit was ripped off her, but she held onto her steed. Finally they came to the surface and with a convulsive leap he broke through the hard cement wall. The jagged edges made long scratches in the woman's bare back—then down through the streets of the termite city, now in the

greatest confusion and at last to the water's edge. She took off her shoes. The ship lay, a dark shadow a hundred yards from the shore. Lights at the ends shown like evening stars in the soft moonlight. Susanne jumped off the insect's back. She patted his face.

"You can go now," she said, "and thanks. You have been a real friend," and then she waded into the surf. Deeper in, over her knees, up to her thighs and belt, and then sinking into the warm salt water, she started to slowly swim back to the ship. The salt water stung the deep scratches in her back, and she felt tired and hungry. yet her heart was filled with a great joy. Hours before she had started towards the accomplishment of a certain task and now she had succeeded. She had found out what she had wanted to find out. She knew now where the missing members of the expedition were. She knew what the Central Intelligence of the Giant Termite was. She knew something about the Central Rulers of the various nations of the human race—and she knew that she loved Adam Fry.

Susanne Tells All

THE tattered fragment of her torn bathing suit hampered her swimming, so treading water she tore it from her. She kept on her belt and her holster which still held the empty automatic. Then she started to float, a white spot in the dark, mysterious blue of the midnight ocean. Above her she saw a piece of the moon and a thousand million stars. Little fish came and gently nibbled at her toes. And Susanne was glad that she was alive. It made little difference whether she was just an insignificant human being or not. She knew that Adam loved her—and she loved Adam.

Finally rested, she swam to the ship. It was her hope that she could climb on board without anyone knowing; but she heard a whistling, monotonous and low, "All bound round with a woolen string, all bound round with a woolen string." It was her brother's favorite when he was in deepest distress. Swimming around the ship till she was directly under him she called,

"Bill, Bill. Stop that confounded whistling and listen to me."

The worried man leaned far over the side of the ship,

"Is that you, Susie?"

"It sure is. Go to my cabin and bring me a bathrobe. The sharks ate the bathing suit off my back. And throw me down a rope or something."

When Bankerville returned with the bathrobe Susanne was on the deck in a shadow which she quickly replaced with the silk gown.

"Well, Susanne Bankerville?" asked her brother grimly.

"Stop that," she answered sharply. "I have been through hell enough without listening to you. You get Adam up and dressed and just as soon as I can I will meet the two of you in the cabin. I think that there is going to be a wild time on this island by daylight and I want you to know about it. The quicker we decide on a plan of action the better it will be for us."

"But you have been gone a whole day and part of two nights. Where have you been and what has happened?"

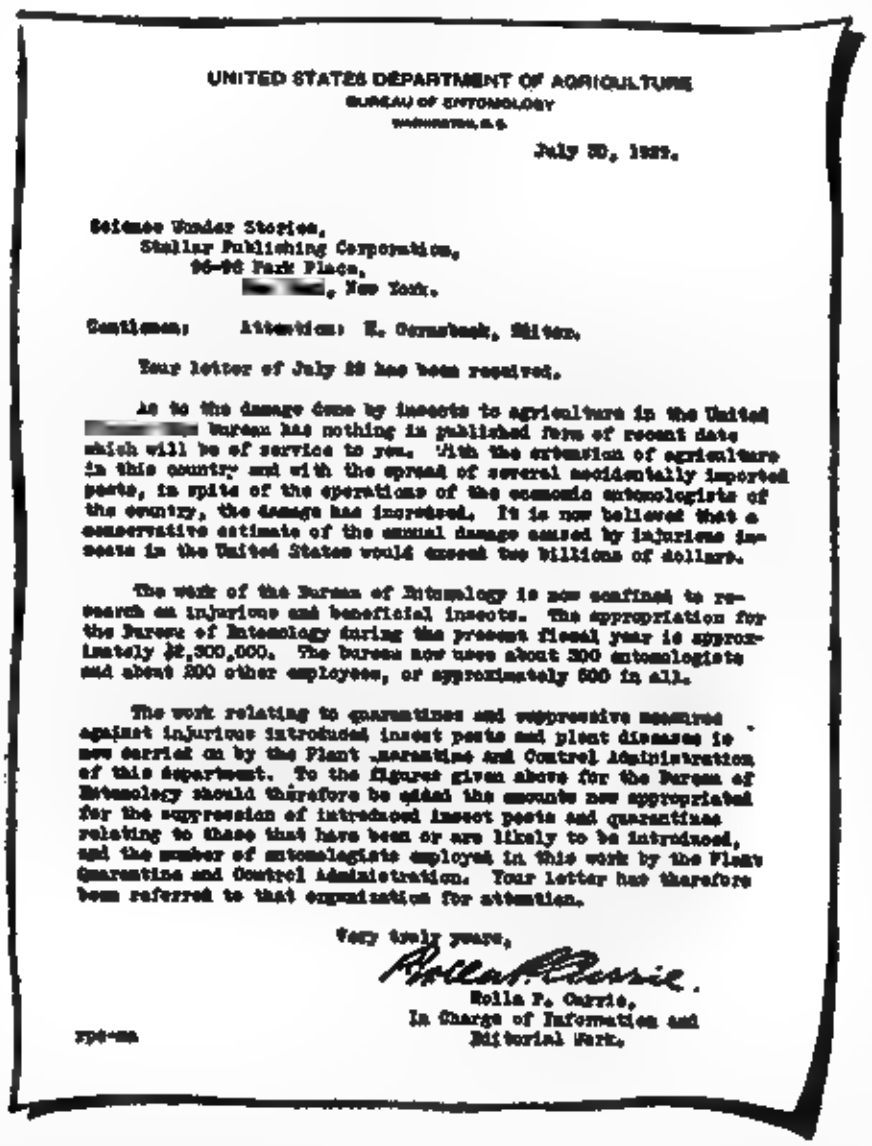
"Wouldn't you like to know? You'll find out soon enough. You go and get Adam and don't stand there arguing. Nothing I hate more than that."

Bailey Bankerville and Adam Fry waited in the cabin for over half an hour. The rich man swore.

"I suppose she is dolling up. Why in the name of all that is good and holy can't she come on?"

But Susanne Bankerville knew that she was in love and she did not want to see the man till she was looking just as nice as she could. In her determination to appear to the best advantage, she forgot the scratches on her back and selected an evening dress. Finally she walked into her brother's cabin looking more as though she were dressed for a ball than for a scientific conference.

Bailey looked at her and shook his head as though he understood the situation thoroughly. Adam Fry looked at her as though he were in Heaven and she a spirit of the upper ether. For a few minutes there was a confused medley of scolding and laughter and a few tears. Finally the brother slapped Susanne on



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
WASHINGTON, D.C.

July 30, 1929.

Science Wonder Stories,
Stellar Publishing Corporation,
96-98 Park Place,
[redacted], New York.

Gentlemen: Attention: H. Gernsback, Editor.

Your letter of July 28 has been received.

As to the damage done by insects to agriculture in the United [redacted] Bureau has nothing in published form of recent date which will be of service to you. With the extension of agriculture in this country and with the spread of several accidentally imported pests, in spite of the operations of the economic entomologists of the country, the damage has increased. It is now believed that a conservative estimate of the annual damage caused by injurious insects in the United States would exceed two billions of dollars.

The work of the Bureau of Entomology is now confined to research on injurious and beneficial insects. The appropriation for the Bureau of Entomology during the present fiscal year is approximately $2,300,000. The bureau now uses about 300 entomologists and about 200 other employees, or approximately 500 in all.

The work relating to quarantines and suppressive measures against injurious introduced insect pests and plant diseases is now carried on by the Plant Quarantine and Control Administration of this department. To the figures given above for the Bureau of Entomology should therefore be added the amounts now appropriated for the suppression of introduced insect pests and quarantines relating to those that have been or are likely to be introduced, and the number of entomologists employed in this work by the Plant Quarantine and Control Administration. Your letter has therefore been referred to that organization for attention.

Very truly yours,

Rolla P. Currie,
In Charge of Information and Editorial Work.

rpc-ma

This letter, received from the Department of Agriculture, indicates the attitude of our government toward the insect menace.

her back:

"You should have let us know, Susanne. Bad business to go off that way. Goodness gracious." And here he took her by the shoulders. "Do you know your back is all scratched? I will have to have the Doctor see it at once."

"Yes, I know about it; but there won't be nothing done till I tell you two men my story. Even then I don't want that old Doctor to paint it with mercurochrome. I think you might be a little kind to me, Bailey. I've been through enough."

Suddenly she ceased to be a little girl and changed to a capable woman.

"You men sit down and listen to this story. And it's all true, so you need not think that I am drunk. And it all harmonizes with our fancies, only it's a thousand times more horrible than we ever pictured it. Bailey, if your sister hadn't had some intuition, the whole expedition would have been killed. That reminds me. Are the two hydroplanes in good order? Can we travel in them? If not I wish you would have the men start in at once and overhaul them. We may need them by morning. Of course you know I went to the island to find those nine men. They are all dead. Six of them were dissected by the termites to show them the different systems of the human body. Two of the other three were operated on and died, and the third man, Smithson the photographer—well, he is dead, too; and I guess I helped kill him, though he did not have any brains to start with. Now here is what happened"—and she told the story of her hours on the island.

CHAPTER X

A World Gone Mad

IT is complimentary to both the woman and the two men to be able to say that they heard her through to the end of her story without at any time interrupting her. It was two when she started and it was four-thirty when she finished her narrative. Neither man had said a word for two hours and a half. Both of them had made notes, scattered fragments to recall to their attention certain portions of the tale. Except for the movement of their pencils and the occasional lighting of a cigarette they hardly moved. Finally, she ended:

"And so I came back to the ship. Time will tell whether the trip was really worth while. I feel that I really heard and saw those things and I do not think that you believe those scratches on my back are self-inflicted. The six empty shells are still in my automatic. I am not going to worry about Smithson. Even if his brain had not been removed something of his personality remained and that deserved killing. I am not sure what the next move should be, but I believe we are going to be attacked by the Giant Termites soon. I mashed up that Thing that crept into Smithson's skull pretty much, but I am not sure that I actually killed it. Perhaps this is their first actual contact with firearms. They must know of the existence of powder, but this is the first time it has ever been used on them. I feel that we have learned a great many of the facts that we came to this island to learn, and the quicker we leave for a colder country the better off we will be."

Bailey Bankerville stood up and stretched his arms above his head.

"Sister," he said, "if any other woman would tell me a tale like that I would unhesitatingly call her a liar. It is the wildest, most impossible tale I have ever heard from the mouth of any human being. It is almost twice as impossible as the wildest fancies of Verne, Poe or Wells. It is impossible and yet I believe that it is true. You left about 40 hours ago. In that time Hell started to break loose on this earth. Whatever the cause is makes absolutely no difference, the fact remains that all at once the entire race of human beings on this sphere has gone insane. Russia, China and Japan have started westward to conquer the other nations. The blacks in Africa are moving northward and their leaders have promised them the loot of Europe if they reach there before the yellow men. South and Central America has combined with Mexico to invade the United States and Canada. Meantime, just when you would expect the States to realize their danger, a Commune has captured New York and Chicago, and are endeavoring to overthrow the Government at Washington. England is trying to control the ocean with the aid of the United States. We heard this news over our radio and it came so fast that we have not been able to digest it. Adam and I went over the history of the world as far as we were able to and we feel that this is the first time that the entire human race has gone mad in such a short time. We cannot understand it."

Adam took up the thread of the thought.

"Now according to what you heard on the island, Miss Bankerville, there are various higher forms of Power which govern the different nations. You said that the Thing that talked to you told you that he thought the Ruling Intellect of the Human Termite we call the United States resides in an inaccessible part of the Rocky Mountains. I suppose that there are as many of these Ruling Powers as there are nations. No doubt now and then one dies of old age, and then what little human termites are left are captured and absorbed by younger, stronger Powers. That seems to harmonize with history as we know it. The Thing on the Island told you that these Ruling Powers of the human nations were rather dumb. They certainly have not the intelligence of the Giant Termite. Apparently they have all had the same thought at the same time and that is to start fighting for the control of the world. They seem to be at cross purposes. For example, if Chicago and New York are part of a Giant Human Termite, why does the Central Intelligence permit this rioting? He should be making everyone of his corpuscles throughout the extent of his national body engage in an united effort to successfully fight any enemy. He seems to be unable to do this. Perhaps part of his body, like New York City, has developed cancer-like symptoms and he is no longer able to control them. Perhaps, like the old nations—Egypt, Sumeria, Babylon—he is growing senile and will soon die. Of course all this is pure hypothesis. But let us look at the matter from a point of view with which we are more familiar. The more the human

nations fight and weaken each other, the easier it will be for the Giant Termites to conquer the world and completely destroy the human race. Do you two feel that there is any way of warning them? From what you learned, Miss Bankerville, do you think it would be worth while to try."

"I learned one thing. If you ever call me Miss Bankerville again I will never, never have anything more to do with you. I think it is perfectly horrid for you to treat me the way you do."

And then she started to cry. Bankerville went out to give some orders and when he returned he found his sister curled up in Adam's lap evidently engaged in a sign conversation that was entirely remote from the termite problem. Susanne and Adam both smiled when they saw the banker; and the little woman lost no time in announcing the news.

"You can congratulate us, Bailey. Adam has asked me to marry him and I am going to do it—just as soon as we get out of this mess. Have some coffee and sandwiches sent in and we will have breakfast together in here."

"This is a great surprise to me, but if it suits you, it does me," said her brother. "I think Adam Fry will be a rather good man to take care of you, even if he is an insignificant little termite."

"He is nothing of the kind. He is going to be a big man some day in the affairs of the world, are'nt you, Adam."

"Sure, if that is what you want me to do. Any news from the Island, Bankerville?"

"Not a thing, but rather serious news from the ship. The Captain seems to be rather level headed but everyone else on board the ship is developing hysteria. I have just had a long talk with the Captain. He says that the men, and that includes the scientists, feel that we have not done our best to find the missing men, and they are going to demand that we send them ashore with supplies, weapons, including all the dynamite, and they are going to stay there till they succeed in their search. They think you know more about it than we are letting on, Sister. They know you went on the island and came back——"

The First Struggle

JUST then the Captain knocked on the door and hastily entered, "I cannot do a thing with them, Mr. Bankerville. They are determined to go on the island. The chemist says that he has enough liquid poison in his spraying apparatus to kill a million billion termites. They are demanding provisions and all the dynamite. What shall I do?"

"Are the hydroplanes ready?"

"Absolutely, but the aviators are asking to go in the boats with the rest of the men to the Island."

"Can you run one of those planes, Captain?"

"I can; and so can Miss Susanne."

"Then let them go. Tell them they can take anything to the island that they want except my personal property. Tell them that they go on their own responsibility and that we think it a dangerous and foolhardy undertaking."

The Captain left the room. Adam Fry smiled.

"Now there is an example of this Supreme Intellect. Here are twenty men from all walks of life and of all degrees of education and suddenly they are seized with the same impulse and the same thought. They have to go to the island. Do you suppose that this thought is really a command sent them by a ruling power? If it is, why are we immune?"

"I do not know," said Bankerville, "and I don't care. I do know this. I have confidence enough in my sister to believe that just as soon as they land on that island and start using that dynamite that Hell will be popping. They will never come back. I think that just as soon as they leave we had better provision the hydroplanes and be ready to travel, because they are going to come out here and destroy this ship. The Captain and I will take one hydroplane and you two imbeciles from the Land of Love can have the other. I do not know where we will go but we are not going to stay here and have those twenty-foot monsters cut us in two. We had better stay in the cabin with our guns handy till the rest of them leave. No telling what they might be ordered to do."

Susanne yawned,

"I am real tired. Adam, will you paint my back and then let me go to sleep in your arms?"

Adam lost no time in saying that he would do anything she asked him to. Her back looked somewhat barbaric by the time Adam was through but he thought it was just the nicest back he had ever seen.

So all that morning she slept and the two men waited. It was afternoon before the Captain came back,

"They are gone," he said, "with enough provisions to last a week. And there is something else to tell you. The ship is leaking badly, and I think that she will be sunk in a few hours. I have an idea—though perhaps I had not ought to say it——"

"Sure, blurt it out," said Bankerville, encouragingly.

"Well, here it is: the last time the diver was down he said that the tubes under the ship seemed to be fastening to the bottom of the ship. I wonder if those little termites have not been eating the bottom out of the poor thing?"

"That is just it, Captain. If the ship sinks, its the termites that sink her. Suppose I go with you and help you with those hydroplanes. Adam, just as soon as your Eve wakes up, you two pack your personal belongings and be sure to take food and ammunition with you and load your hydroplane. Then you take telescopes and see if you can find out anything about those fools on shore."

But though the four on board ship searched the island carefully with their glasses, they could see no signs of any unusual activity. Now and then they could see a man walking down a termite street. At dark a fire showed that a camp had been made. The Captain reported that no more water was entering the ship and after arrangements were made to share the night in guarding the ship, all lights were put out, and at least Susanne slept soundly, bothered only by the increasing stiffness of her back. They were all at their

breakfast, which Susanne, in the absence of the cooks had prepared, when suddenly a dull roar was heard from the Island; then another—and another.

"Christopher Cripes!" exclaimed the Captain. "They are using the dynamite."

The four rushed to the deck. A peculiar hum came from the Island and at the shore end of one of the long streets clouds of yellow dust showed where at least three termitaries had been blown into powder. Near the beach, in a little group, stood the men from the ship. Through the telescopes it could be determined that they all had rifles in their hands. They seemed to be waiting something. They did not wait long. Slowly from the hole dug out by the shattering power of the dynamite a five foot scissors appeared in front of a twenty-foot monstrosity. Then came another and a third and a dozen more. They rushed upon the little clump of men, who began to fire on these gigantic insects with their rifles. A row of hidden dynamite exploded, blowing many of the insects to pieces. But still they came and then in a wave they advanced. They reached and covered the men like a wave. They stayed there for a while and then went back into the hole. On the sand the mutilated men lay dead. Now another group of giant insects came out of the same blasted hole. They formed a ring around the dead men.

The Captain stared though his telescope. Finally, he cried,

"Mr. Bankerville, do you know what they are doing? They are eating those bodies!"

"Certainly," answered Susanne. "They eat everything. When they start the conquest of the world they will need no commissary trains. As they conquer they will kill and as they kill they will eat, and when they are through with this old world it will all be nice and clean as that beach will be in a little while. Those termites are utilitarians."

Her idea was confirmed. Within a half hour the scavengers went back into the hole. On the beach there was just a space of red, wet sand which would be washed clean at the next high tide.

"That is rather horrible," exclaimed Adam Fry.

"That is just a beginning," answered Bankerville. "If there are millions of such creatures all through the tropics, imagine what will happen to human civilization when the command is given to them to advance and destroy. They will probably come up to the United States through the Gulf of Mexico. New Orleans is a deep water harbor. The Mississippi is 90 feet deep at the city docks. Perhaps there are giant tunnels stretching from Central America right up to the city. A little work will bring those tunnels to shore and then imagine a city of a half million suddenly attacked some morning by an equal number of such insects. Suppose they capture Galveston and came up the river to Memphis? In a week they would be in St. Louis and Chicago. I tell you the whole nation would rush panic-stricken into the ocean and drown just as soon as they realized what was attacking them. And back of the warriors the scavengers, eating, eating, cattle, men and women, everything that was alive or dead."

"You have a sweet imagination, Brother," said Susanne. "Oh! Look there! What is that?" and she pointed to the side of the ship.

New Plans

"THEY are after us," cried Fry. "We must get to the planes. I am glad that we bought the best that money could buy and had the ship arranged for a get-away. I do not believe we ought to waste a moment. Bankerville, you and the Captain get in and let me start you. I want you to get out of the runway before Susanne and I start off. Bankerville, you have your elephant rifle handy because if we don't get off at once they will be on board ship."

"Where are we going to head for?" asked the Captain, from the pilot seat. "Any definite objective?"

"Yes, we ought to go to Australia first. Those people are English, they are blood kin. They may treat us kinder than at other places. We have lots of gas and will have no trouble reaching land."

Adam whirled the propeller and in a minute the first plane was off. A rifle shot added to the clamor and Adam running back to the second plane saw Susanne standing up in the cockpit a large express rifle in her hand.

"One of the things started to climb aboard so I blew his head off."

"You watch them, Susie," yelled Adam above the roar of the second propeller. Susanne never heard him, but before their hydroplane left the ship she had shot three more. Once started they slowly circled over the deserted vessel. A dozen monstrosities were rushing into every part of it searching for more victims, more to kill and more to eat.

Adam grinned at Susanne.

"This is a great life if you don't weaken," he shouted.

"I am not weakening," she shouted back, "but my back is certainly stiffening. Here, let me feed you this ham sandwich."

Ahead in the twilight the plane carrying Bankerville and the Captain went into the glorious sunset. Three miles behind Adam and Eve-Susanne flew on having the time of their young lives. What cared they though the civilization of the world was crumbling, what difference did it make to them if the Giant Termites ruled? They had each other.

All that night and most of the next day they went in a straight line due Southwest and finally struck the Australian coast at the little town of New Castle, just north of Sydney. They drove the planes up on the sand beyond high water mark and then started to talk over their future plans. The Captain wanted to get back to the United States as soon as he could. He was a member of the Naval Reserves and felt that with war actually declared that it was his place to report for active duty at once. His ship sunk, there seemed to be no special reason for his remaining in the party, so Bankerville gave him some letters of credit and enough gold to pay his passage to San Francisco. With mutual

sorrow they said goodbye to each other and the shipless sailor started to walk to town with the idea that he would soon secure an automobile to take him to Sydney and would leave for the United States on the first boat.

That left only three of the original expedition. The question for them to decide was what to do next, and how to do it. They had no recent news from the world at large concerning the hysterical national reactions which seemed to threaten the whole world into war. While they felt in a way that the National Rulers were responsible for this still they had no positive proof that such Things actually existed. There was much about the whole affair that was almost too great for them to form an intelligent viewpoint; the scope of the vision was so gigantic that it seemed that only a part of it could be comprehended at one time and even that part of it was forgotten when another aspect was investigated.

While there was no doubt in the minds of any of the three as to the horrible menace of the army of crossbred soldier termites still it was hard even in regard to that to imagine a world devoid of humanity and entirely governed and populated by the Giant Termites.

"I confess," said Bankerville, as they were eating their supper, "that I am at a loss to know what to do next. If we go anywhere near civilization we are going to run into a war of some kind. Perhaps even at this moment, as we sit here so peacefully on this lonely beach, the mob of deluded citizens are looting the White House and stringing the Senators up on electric light posts. Who would there be to talk to? Who would listen to our story? We would be laughed at and if we were identified we might be killed as other rich people are being killed this very minute. The semi-civilized countries are lapsing into savagery and the highly civilized ones like England and France are no doubt acting as though they were on a profound alcoholic debauch. Meantime the Giant Termites are waiting the time to spring. They may have wanted to transplant their Central Intelligences into human bodies but it will be an easier thing to put themselves into the brain pans of the gigantic warriors they have made. I believe they are preparing to spring. How would it do to abandon one of the planes, put all the gas we can into our tanks and try to make the States via the Fiji Islands, Honolulu and San Francisco? If I remember the distances it is about 1700 miles to Fiji, about 2700 from there to Honolulu and 2000 from there to San Francisco. Of course we have to take a chance on not being able to secure gas at these places; but even at that I feel that it would be worth while to try it. I am not sure what we would do once we were in San Francisco."

"I know what we ought to do," said Adam Fry decisively. "I think we ought to find Souderman and not make any definite plans till we are able to thoroughly talk over the matter with him. He started this termite investigation and it is no more than fair to place him in touch with the latest developments."

"Do you know where he is?"

"Yes, approximately and I bet that it is a hard place for the termite to reach. I want you to meet him, Susanne. He is a grand old man."

"I think that brother's plan is a good one. I feel that we ought to have a good sleep and the first thing tomorrow start preparing for the trip to the States. We are in Australia, an island noted for its large number of termitaries. They may decide to capture Australia as a preliminary for the conquest of the entire earth. I feel that there is no time to be lost; we must not wait. It is going to take a little time to change things so we can make the trip in one plane and we must start tomorrow; but first we must rest. I do not know how you men feel but personally I am dead tired."

"Let's take her advice and get some sleep," said Fry. "Are you sure, Bankerville, that one plane can carry all three of us?"

"I think so. Susanne won't take up much room. She probably will want you to hold her most of the way, anyway."

CHAPTER XI

The Refugee

THE next morning the three worked their hardest. By night the largest of the two planes was ready for the trip. They decided on another night's rest. Suddenly during the night, they were wakened by the honking of an automobile horn, and instinctively grasping their rifles, sprang to their feet. An old fashioned Ford was coughing its way down through the sand to give a final gasp near the planes. A slight lad jumped down from the seat and walked toward the three.

"I am so glad I have actually found someone," he said. "Father is in a bad way. He had a hemorrhage on the way out here and I think that he is very sick. If any of you know about tuberculosis I wish you would help me look after him. We left Sydney early this morning. I guess we were the first to leave. Father had fever and he might have been upset by the shock of seeing those first things come into the city but he insisted that we get into the Ford and get out. He said that it did not make any difference where we went just so we traveled. They nearly caught us just the other side of New Castle but it was dark by then and we got away from them; but I guess from the screams they killed a good many there."

"Brother," commanded Susanne. "You and Adam go and see what you can do for that sick man, and I will give this boy something to eat. You come with me on the other side of this plane. Those men will look after your father. And now my dear girl, tell me your name and all about it?"

"How did you know I was a girl?"

"Anyone could tell. Besides, no boy has a right to be as beautiful as you are. That man I called Adam is my fiancé, so you keep away from him. What happened in Sydney?"

But the story was not told then. Bankerville came up.

"I am afraid that your father is dead, my poor boy," he said softly.

The men dug a grave in the soft sand and there they buried the poor wanderer. They drove the Ford over the grave to serve as a monument to what had once been the latest model of a wonder baby. Adam Fry said a few words and made a prayer for the peace of the man's soul. Then the four went back to the shelter of the plane and the girl told her story.

"We have traveled all over the world because father was sure that somewhere we would find a place he could get well in. He wanted to find his health and he wanted to find someone to care for me in case he died. We just had a little money when we came to Sydney so we lived in the Ford and I did fancy work while father tried to teach Latin. We did not do so very well at either occupation. Still father hoped for better days, and he was sure someday that we could move on and find a new and healthier spot.

"No matter if we went hungry he always insisted on keeping the gas tank filled. Last evening we were sitting in the Ford. He liked to sit there beside me on the front seat and pretend we were going somewhere. The Ford was just about a hundred yards from the bathing beach and there were lots of women and children in bathing. Then they started to run and scream and we saw a lot of black things rising out of the water and running down through the surf cutting the women in two with long jaws that worked like scissors. Father said, 'Anna Ruth, start this Ford and go—just go—because if there are many of those things they are going to kill everyone in Sydney! Our batteries were down so I had to crank the old Ford but finally I got it running and none too soon. One of them came after us but a little baby got between us and he stopped to kill it and in the confusion we got away. I do not know how things were in Sydney but we could hear guns and whistles. We ran into some at New Castle. They were just starting to drag the people out of their houses there but we went around the town and all we could hear was the screaming. Do you know what they are?"

"We certainly do, dear, we know more about them than we want to," said Susanne, as she looked anxiously toward the beach. "But now you try to go to sleep and on the morrow we will see what we can do about it."

"Will it be safe for me to sleep? I would like to if I could. Father always held my hand."

"I will hold your hand," said Bailey Bankerville. "You can just pretend it is your father. You will feel better in the morning. Adam, you and Susanne go over the plane and see if you can discard about ninety pounds of our baggage. This little Anna Ruth has come to us and we cannot leave her here. She is going with us—as a mascot and I feel that she will bring good luck."

The early morning came. So far there was nothing unusual either from the ocean or the land. Adam sat on one side of the plane with an elephant rifle and Bankerville sat on the other side similarly armed. The two women made a little breakfast. While they were still eating a two-passenger twelve-cylinder Isotta-Fraschini car came thundering over the sand. A fat middle-aged man was driving it. He nearly hit the wing of the plane before he stopped. Jumping out he wiped his face with a multicolored handkerchief.

"Good I found you. I want to buy this plane. Or you can take me as a passenger. Hell has broke loose in Sydney and I want to get away from this island while the getting is good."

"The plane is not for sale and you cannot go with us," answered Bankerville, curtly. "We will give you a sandwich and ask you to go on your way."

"Damn you. You don't know who I am. It will pay you to leave one of these women here and take me."

Fry sprang at him, but the man whipped out a revolver.

"None of your funny work," he said. "I mean business."

A shot rang through the air. The man looked puzzled and then fell, crumpling to the sand.

"I had to shoot him, brother," said Susanne. "Did you see him point that gun at Adam? Think I am going to let anyone hurt my Adam?"

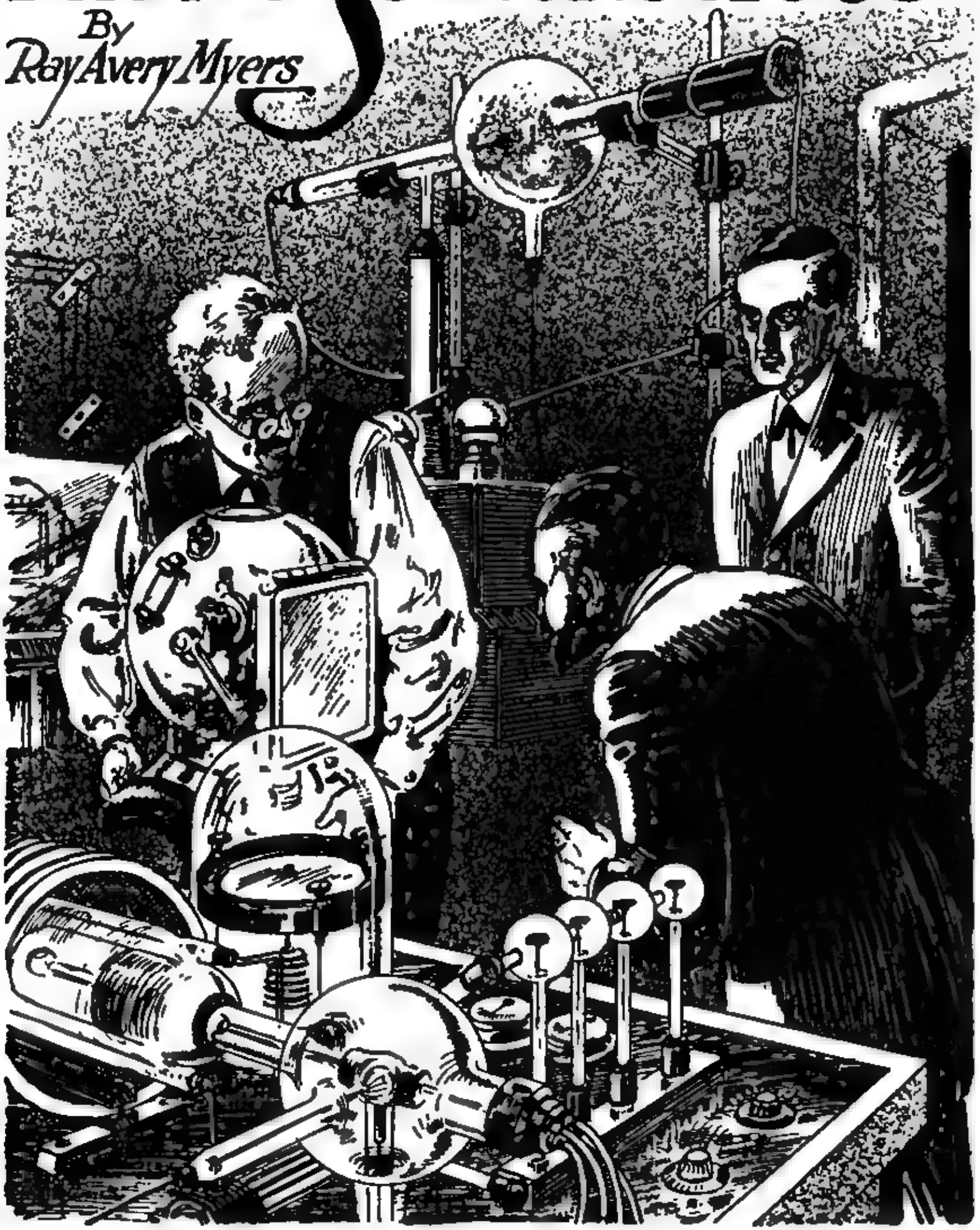
"All right," said the banker. "Perhaps you were a little premature but you saved me the trouble. That is not the point. He is just the first that will come here and do anything their panic-stricken minds think of. I believe that the best thing for us to do is to start on our journey. The quicker the better. Little Anna Ruth, you are going to be crowded, but you are welcome to what we have and we want you to know it. We discarded ninety pounds of junk last night to make room for you. I wish that we could take every little girl in Australia with us but we cannot do that. But we can take you. Let's get started."

Ten minutes later they were slowly gliding from the ocean waves up into the air. They wanted to fly over Sydney and see for themselves what was happening there but they felt that they had to save every drop of gasoline for the journey. So on they sailed on the long voyage that they hoped would end at the front door of Souderman's cottage.

(To Be Concluded)

Into the SUBCONSCIOUS

By Ray Avery Myers



Taking one of the helmets from the case, he gave it to them to inspect. "You will note," he said, "these sponge electrodes that press against the temples of the wearer. They are to catch the thought waves leaving the brain."

INTO THE SUBCONSCIOUS

HIS cigar had gone out unheeded, as he sat with head bowed on his broad chest. Unheeded also were the flakes of white ash that sprinkled his vest. Spread out in the large swivel chair, his feet and legs stretched straight in front of him; his body sunken till he sat, as it were, on the small of his back; his head tilted till his cigar tip touched the wrinkled folds of his vest, he appeared asleep in the murky rays of the yellow light over the desk. But one glimpse of the heavy-browed eyes would have told you he was far from asleep; in fact you would have agreed that a keen, active mind was at work under his grizzled curly hair.

RAY AVERY MYERS

"H. A. MACEY, M.D." read the weather beaten sign beside the door of the old brown house, and "Doc" Macey he was called throughout the countryside. Citizens would have told you that he was the best medical man in the county.

But his country patients would have become wide-eyed with wonder and disbelief, had they known that, though he was known familiarly as "Doc Macey" to them, he was known to the scientific, far beyond their ken, as Professor Macey, with a string of letters as long as a kite tail after his name.

He had come to them some years back to take over the practice of old Dr. James, who had departed this life to stand before the Greatest Physician of all, and had quickly won their hearts by his skill and understanding. But it is hard to say what they would have thought of him had they really known who he was.

A few short years before, his paper on "Physiognomy and Related Hereditary Instincts" had taken the scientific world by storm and made him an outstanding figure in the scientific societies throughout the civilized world. Then, a year later, came another: "Searching Out the Prehistoric Man Through His Present Day Ancestors."

This had been taken in an entirely different light and had been laughed to scorn by the very colleagues and friends who had so enthusiastically applauded his previous paper. Hurt to the heart by this, he had buried himself in this sleeply little village, and soon was completely forgotten.

But the scornful laughter of his former friends had not quenched his ardor for the beloved subject of his research, and he had labored and planned continuously in his spare time ever since he had exiled himself in Stockton, and now tonight he was about to put his theories to the supreme test.

In appearance, he had a broad, high forehead; dark, piercing eyes, which continually looked over the top of his spectacles, so completely ignoring them at times, that one wondered why he wore them at all. He was looking over them at the particular time we open our story, gazing abstractedly at a lurid calendar on the opposite wall of the office. Suddenly his eyes shifted to the old clock above the calendar. Noting the time, he straightened up in his chair, brushing the cigar ashes from his vest as he did so.

As he rose to his feet a long, mellow whistle came through the still air, and with a rumble and crash, the 7:15 local came to a grinding stop at the village depot, a block down the street. A short pause and the train was on its way again.

The Doctor stepped to the window and peered out, trying to pierce the murky twilight in the direction of the station. But, as it was fast growing dark, he soon gave it up and turned to poke up the grate fire, fidgeting with the tongs and coal bucket, now and then turning his head toward the door to listen. At last he was rewarded by hearing footsteps crunching up the gravel walk outside. The ancient gong on the door gave forth a blurred and strangled sound and the Doctor strode forward and flung it wide wide open.

Outside stood a tall, thin man, whose thin smooth-shaven face appeared dimly in the sickly light that shone through the open doorway.

"Come in, come in," boomed the Doctor, in a deep mellow voice, reaching out and grasping the other by the hand, "I was afraid you couldn't come. Ah," he added, as another figure loomed behind the first one, on

THE present author has opened a new realm in science fiction in a most interesting as well as marvelous manner.

So little is understood about the functioning of the human mind and so little do we know about the origin of it, that almost anything seems possible.

If you think of the marvelous feats that the human mind can produce, we often stand aghast at its possibilities. When we see people who can multiply any two numbers of 9 digits and give the result immediately, when we see others who can play thirty games of chess in their heads simultaneously, when we consider the hypnotic possibilities of the human mind, and when we delve into the great infinity of the sub-conscious mind, we realize how much remains to be discovered about the marvelous mechanics of the human brain.

And let no one think that the present story is too fantastic. Every one who has dreamt of falling out of a tree or falling through space, has probably wondered as to the mental processes that produce such dreams. Psychologists tell us that it is simply a pre-historic instinct, going back to the time when we still lived in the trees.

The present story makes this evident.

the gravel walk. This proved to be a middle-aged man with a heavy black beard. The tall, thin man turned to the other and quickly introduced them. "This is Prof. Raoul Le Brun, of the University of Marseilles, Doctor Macey. He is on a visit to this country, and strange to say, I found out last week that he is interested in the very theories and researches which you and I are following.

An Amazing Theory

THE Doctor shook the French scientist's hand warmly and motioning them inside to chairs, closed the door on the cold March night.

"That is interesting to say the least," he exclaimed. "How did he happen to strike upon our particular pet theory?" he asked the thin man, who, by the way was none other than the Prof. Mannering, of the New York Museum, and a world authority on Paleontology and Anthropology.

"I will answer the question myself, my good Doctor," said the Frenchman, with a good command of English. In fact, he spoke it fluently. "You are the one who interested me."

"I?" exclaimed the Doctor. "How? I never saw you till a few moments ago, man."

"How?" echoed the Frenchman. "I've read every word you ever wrote and your last paper, before you dropped out of sight, set me afire. It was an entirely new thought and though most of the scientific world laughed, the fools, believe me, Doctor, I didn't laugh. I saw your point and the logic of it made me gasp. And seeing that you believed in it was enough for me. But, you did not even hint as to your methods."

"I know, I know," admitted the Doctor, "to have done so right away would have made the most of them laugh the louder, and set the rest to experimenting. That, beyond a doubt, would have resulted in some sort of trouble. You remember what happened when young Prinz got hold of some of my papers on chemistry at the University and nearly blew up the laboratory one night. No, no, that would have never done, to set some of those scatter-brains on a scent that would have soon either lost them or have gotten so hot they couldn't have held it.

"I have had to feel my way very cautiously and work in seclusion to bring my researches up to the point I have reached tonight. I have asked Prof. Mannering to be present here tonight, at my first real experiment and am more than glad, Prof. Le Brun, to have you also."

"Even to meet you has been the crowning result of my visit to your so wonderful country, but to be present at your great experiment, ah, I am delighted beyond words" and the Frenchman's black eyes gleamed with hearty satisfaction. "But, pray, Doctor," he continued, "would you be so kind as to outline your theory and your methods?"

"Of course, of course," exclaimed the Doctor, "but first let us compose ourselves a little more comfortably." He shook up the fire and bade them draw their chairs closer to it. Passing cigars to each one, he took one himself and seated between the two, proceeded to light up.

"To begin with, I am, as you both are no doubt, a deep student of the human face and body and their characteristics.

"Now, you often note human faces that resemble the faces of other than humans. For instance, you will note a person with a long nose and close set eyes, what more natural than to compare this person with one of the lower animals, such as a fox or a rat; a tall, thin person with a stork, one with quick movements with a wren or a sparrow? A fat face with a snout-like nose resembles a pig and usually such a countenance is accompanied by a body of swinish proportions and habits and brains. Not always, note you, but there are times when you meet one with such strong features along these lines that you unconsciously place them in some such category. Do you follow me?"

The others nodded without speaking and the Doctor went on.

"What is more natural, taking into consideration the theory of evolution, which no one with common sense doubts, to go one step further and say, 'that person is a throwback.' In other words, you say, 'the strain of his prehistoric ancestors has come to the surface more or less strongly.' Do I make myself clear?"

Again they nodded.

"Now if our theory is not faulty, how can we prove it? We cannot ask a man if his grandfather was a bear or a monkey, because we know he was not, but at the same time, taking into consideration the fact that a man's knowledge of his progenitors, grandfather, or great-grandfather, goes only as far back as this, how are we going to get beyond the great-grandfather and the great-great-great grandfather, till we get to his ancestors back beyond the time when man first walked the earth as the man we see him today; back into the time of steamy swamps and lagoons, peopled with creatures we know nothing of, except for a few fossil remains, whose skeletons we have in your museum? As we well know, man has many of the instincts of his pre-historic forefathers, such as, fear of the dark and so on. So have all the other creatures, that have come up from the past with man. Even pigeons, who have never heard a gun fired, will fly in terror at the sound of an automobile back-firing, which is nothing but inherited instinct handed down from ancestors who had been hunted as game in some time not long past.

"Now we come to the last step in my reasoning and then I will explain my theory and the idea for my experiment, tonight. We all have, as you know, the sub-conscious mind. After following the thought I have outlined to you, what is more natural than to believe that the memories in the sub-conscious mind are passed on from one generation to another, accumulating and storing away all these instincts, down until the present time, we have within us the instincts accumulated from the first creatures."

He paused and glanced from one to the other.

The Frenchman blew out his breath with a great cloud of smoke—"Wonderful reasoning," he exclaimed. Professor Mannering sat staring at the Doctor, too absorbed to realize that his cigar had long since ceased to burn. "By Gad, Macey, it's possible, it's possible," he finally assented.

The Doctor smiled and held up his hand.

"Wait, I'm not through yet. The next step is this: Now your own minds, gentlemen, are continually absorbing new thoughts, new experiences, your eyes impressing photographs on your minds, which retain them. You can visualize the faces of friends and scenes of the years past, but not *beyond your present life.* Now why, if this so-called sub-conscious mind can retain the blind instincts of the dim past, why not the actual experiences and sights that taught it these instincts? It is my theory that it does, and I am going to prove it or disprove it tonight."

"How?" they both asked together.

"How would you, Professor Mannering," continued the Doctor, "get at the truth from a man you suspected of lying to you? Torture? No. Persuasion? He would laugh at you. How, I ask you?"

Professor Mannering hesitated. "Well," he said at last, "there is only one thing else you could try," he paused. "Go on," said the Doctor, "and that is what?"

"Hypnotism," answered the Professor.

"That's it, that's it exactly," beamed the Doctor, rubbing his hands together. "Hypnotism."

He arose and paced the floor. "Gentlemen, I've been studying hypnotism ever since I dropped from sight, more than five years ago. This quiet place has an ideal environment to concentrate in and I have made great strides—even beyond my own expectations. I've experimented with everything I could think of and have gone a long way, but tonight," he exclaimed, "tonight, I am going to try a wholly different experiment for the first time."

Arising, he said, "Come with me." He led them to a door in the rear of the house. Opening it, they passed down a flight of steps to the basement.

CHAPTER II

The Sub-Conscious Mind Searcher

PASSING through the basement, he opened a door in the old stone foundation wall, and passed through into an underground room that was fitted up as a laboratory, with rows upon rows of shelves, various-sized tables and all the odds and ends of scientific research scattered about in orderly confusion. At one end was a peculiar table with glass legs and top, the legs being inserted in rubber feet, somewhat like the rubber tips on a pair of crutches, only that these were larger and were made of sponge rubber. On this table was a large glass case, held together with metal rods with thumb screws on their ends. The Doctor led them over to this table.

"Behold!" he cried. In the glass case were two weird-looking helmets of some sort of glistening metal, with various knobs and electrical connections scattered over their domes. These helmets were evidently designed to cover the entire head and face. There was a large ground glass plate on the one, and a sort of fine meshed screen on the other, at a point that would cover the eyes of the wearer. On the whole, a very weird, uncanny looking apparatus. The two visitors gazed at this exhibit in wondering silence, which the Doctor finally broke.

"This, gentlemen," he began, "is what I have named *The Sub-Conscious Mind Searcher.*" He paused a moment. "Before I explain it I will first tell you what led up to the creation of it. As you know, the human mind has its limits of power. In my experiments I had reached the uttermost limit my mind could go and still I was far from my objective, which, as I have already told you, was the delving into the sub-conscious mind, the reaching of the dim past of that sub-conscious mind. Try as I might, I could go no further back than a few generations. Yes, I got that far back, but beyond that I could not penetrate. It was like trying to see beyond the glow of a flashlight on a dark night. My mind could go no further. What, then, would give my mind the necessary added power? It was a year before the solution was found. Then it came to me suddenly that some sort of electrical energy might be the answer.

"Accordingly I experimented with the various known light rays, the X-ray, the infra-red ray, the violet ray and even discovered some new ones. Some were too strong and others too weak to be of any use, or were too far from the exact type I required to be thought of. I began to search for a ray that was hitherto unknown. I finally found it and in my experiments to find it I also discovered the way to use and control it and at last evolved this apparatus, an apparatus so delicate and sensitive that I keep it in this bullet-proof glass case, on a glass table, protected by the rubber feet from the jars and vibrations."

While talking he had removed his coat and, donning rubber gloves, had removed the wing nuts from the ends of the rods and allowed one side of the curious glass case to drop outward, placing it gently on the table. Taking one of the helmets from the case, he held it out for them to inspect.

"First, you will note inside the helmet, these sponge electrodes, that press closely against the temples of the wearer, when it is placed on the head. Now it has been a recent theory of mine that the temples were a logical point of contact with the brain, thought waves leaving the brain passing outward through the membraneous tissue of the temples. All hypnotists, from time immemorial, have used the eyes as the medium of thought transferance and commands to the subject, which up to a certain point, is more or less correct. But, I go a long step further and use, not the eyes, but the temples for my results and as I proceed further

with my explanation, you will see why. This helmet is the transmitter, the other one being the receiver, which, while it resembles the transmitter in general appearance, is of quite different construction inside. In the dome of the transmitting helmet is the ray generator, which receives its power from an X-ray cabinet (which I reconstructed to meet my requirements), controlled by a rheostat.

"I concentrated my thoughts upon the point I wish to convey to my subject, the electrodes at my temples pick up the thought impulse, transmit it to the generator in the top of the helmet, there it is amplified in such a manner as to be transmitted over the ray, which is carried to the receiving helmet. Then it goes through some changes and is further amplified, finally travelling to the electrodes over the temples of the subject, entering his mind and taking complete control of it, such control as has never been dreamed of heretofore. As you can readily understand, in concentrating my thoughts and projecting them through the medium of the ray, I cannot put the thoughts into words at all. I must put them into generalized impulses for the simple reason that if I did put them into actual words, say for instance, in English, when I had my subject's mind back eight or ten generations into the past, he, no doubt, would be unable to understand English at all. So, I must, as I have said, use a means similar to that which the lower animals no doubt use to understand each other. Do you follow me?"

His listeners nodded silently, not wishing to break into his amazing discourse.

"You will notice on the receiving helmet," he continued, "the ground glass plate covering the entire front over the forehead and eyes. Without this plate, which is similar to the ground glass focusing screen on a camera, and the elements connected with it, the rest of the apparatus would, of necessity, fail of its purpose entirely. This glass acts as the receiving end of a compact television unit contained in part of the helmet and the purpose of this television unit (which, by the way, is my own improvement on the regular apparatus used today to project news pictures, etc., over long distances) is to project in an actual moving scene, the thoughts and sights which are passing through the subject's mind. How this is accomplished would take me too long to explain to you, but, you will see later, it actually does this."

He placed the helmet back in the case and wiped his broad forehead with a large handkerchief.

The Subject

HIS visitors, who had been listening in rapt attention to his every word and devouring his invention with their eyes, immediately burst forth in a torrent of words. The Frenchman actually sputtered like a bunch of fire-crackers and even the staid Professor Mannering became excited and waved his arms like a windmill, pointing to this and that part of the apparatus, fairly spouting questions. It couldn't be true—had he actually tried it—who was to be his subject? And so forth. The old Doctor finally stopped them with a wave of his hand and a smile.

"My friends, not so fast, please," he exclaimed. "In good time, all your questions and your doubts will be answered and set at rest."

He looked at his watch. Five minutes to eleven. "In five minutes my subject will be here and then you will see—well—what you will see. I will now go upstairs to receive him. One word more before I go. I must ask you, please, to observe him closely and to note his type with reference to what I have said on the subject of throwbacks. I have searched for a long time to get a strong characteristic type to experiment on and I think you will agree with me that he is a perfect one. I ran across him on a small farm, not far from here. He is a little dull-witted, but for a few dollars I got him to agree to come here tonight. He knows it is for some sort of harmless experiment, but just what it is he doesn't know and doesn't care much, as long as he gets his money and isn't harmed or 'cut up' as he expressed it (he thinks all Doctors are surgeons and butchers). I think it best that he don't see you at first, so when you hear me coming with him just step into that large closet and pull the door on a crack. When the experiment starts, I will call you out, for by that time he will be unable to pay attention to anyone but me. Above all things, gentlemen, please do not touch the helmets, as they are so very sensitive to even the slight electromagnetic vibrations of the human body, that I have to wear these rubber gloves to handle them."

They both nodded their agreement and the Doctor proceeded up to the first floor of the house.

When he had gone his two friends looked at each other for a full minute. Then the Frenchman broke out with: "*Mon Dieu*, has the good Doctor gone mad? Who ever heard of such a thing? It is, to say the least, bewildering. *Nom de Dieu*, to hypnotize with a machine. What do you think, my dear friend?"

Professor Mannering drew a deep breath, leaving it out with a long shuddering sigh, "Well, Raoul, I've known the old boy for years and up to the time he disappeared to bury himself down here, whatever he said he could do, he usually did, but," with a mournful shake of his head, "I don't know. Living alone here, as he does, in this little village, cut off from his friends of the scientific world, may have made him a trifle—you understand?" The French savant nodded. "I don't know what to think," continued Professor Mannering, "I'm sure. We will have to wait and see."

"But, but," exploded the Frenchman.

"Sh!" interrupted the Professor, "Here he comes with his precious subject and we had better withdraw." He drew the other into the closet, pulling the door to, leaving a crack large enough for them to get a good view of the room, without themselves being seen.

The Doctor entered followed by a queer-looking individual, who walked with a springy, loose-kneed stride. He was of less than medium height, a man

with thin spindling legs and large wide feet. A little round paunch stuck out in front of his body, running up to rather narrow shoulders and short skinny arms with wide, long fingered hands. But, the face was what struck the unseen watchers as being the weirdest feature of all this queer ensemble. A very low wide forehead, bulging eyes, surmounted by almost invisible eyebrows, a wide, thin-lipped mouth, the corners of which seemed to disappear under his tiny ears and looked like a gash cut across his face; a short broad upturned nose, with enormous nostrils and a neck which started, it seemed, from his lower lip straight down to his chest, a neck as broad as his head and as he held his head rather high, he appeared to have no chin at all. This coupled with the fact that his throat was very full and rounded, gave him a startling appearance to say the least.

"My God, he looks like a frog," gasped Professor Mannering.

"Truly a perfect Batrachian specimen," chuckled the Frenchman. "Beyond all doubt, he is all of that and more, if you ask me."

The Doctor, meanwhile, had seated his visitor and had sat down opposite him, endeavoring to put him at ease.

"Well, Sam, I had about given you up," he said, pleasantly, "you are a little late."

"Well, sir, Doc, I try to be on time, wherever I go," answered the man, in a peculiar gulping voice. "I got a late start from home, I did, yes sir, I got a late start."

"Well, that's all right, Sam, better late than never, eh?"

"Yes sir, yes sir," gulped Sam, with a grimace, that, no doubt, passed for a smile. The Doctor made a few more commonplace remarks, meanwhile staring straight into his eyes. Then they both sat quiet for a moment, then the little man grew almost imperceptibly rigid. The Doctor made a few slow passes before his eyes and then arose saying, "That's about all for the time being."

Turning to the closet, he called: "You can come out now." The two men emerged from the closet. "Sit over there against the wall," continued the Doctor. "And don't make any unnecessary noise. He is under my influence, but it may interfere with things if he should be disturbed in any way."

Turning to Sam he said, sharply: "Relax." The little man went limp against the back of the chair. "Get up and go behind that screen in the corner, remove your clothes and put on the bathing trunks you will find there, and stay there until I tell you to come out." The subject arose, and with unseeing eyes, walked the length of the room and disappeared behind a screen placed across one corner.

"Well," asked the Doctor, "what do you think of him?"

"He's the closest thing to a frog I ever saw in a human being, if he is all human," answered Professor Mannering.

"*Sacré nom*, yes," echoed the Frenchman, "You apparently wouldn't have to go very far back to find his ancestors inhabiting some muddy pond or swamp, yes?"

The Experiment

"HE is certainly a throwback of some kind," said the Doctor, musing, "what, I do not know. But we shall see and that soon.

"Come out," he called, and out stepped Sam, sans clothes, except for a short pair of bathing trunks of a brilliant green about his little round paunch. If he had looked like a frog with his street clothes on, a short time before, he was certainly a living image of one now in his present costume. His bluish white skin, his springy, loose-jointed stride, his short arms, held out from his sides with elbows slightly bent, his long fingers spread wide and his splay feet padding down the concrete floor, as he came toward them, gave all three a weird, creepy feeling, as though they were peering around the corner into the unknown. As he came abreast of them, the Doctor ordered him to stop and he stood still.

The Doctor stood before him for some time, studying him as did the others, seated against the wall. The Doctor then placed a chair with a glass seat near the table and ordered the little man to sit in it. He then placed a sheet of glass about 18 inches square under the subject's back, also inserting another sheet of glass the same size between his back and the back of the chair. Then, donning the rubber gloves, he removed the receiving helmet from its case and placed it gently over Sam's head, strapping it under his chin or rather, under his mouth, as he had no chin to speak of.

The front of the helmet was hinged and raising this, he adjusted the electrodes over his temples and then closed it. He next brought out from a cabinet a dozen or so of silk covered wires of different colors, each having bright copper terminals at each end. These he proceeded to attach to various parts of the helmet, allowing the ends of each to hang free. These all coupled up, he took the transmitting helmet from the case and connected the free ends of the wires to the connections on it, leaving two wires that were not connected. These he attached to connections on the huge X-ray cabinet, against the wall. Then he pulled a long flexible cable out of the X-ray cabinet. This cable had a foot pedal on the free end, such as is used to control the current on the ordinary X-ray machine.

He placed this pedal close to the chair opposite the subject. Then carefully checking over each connection, to make sure everything was in order, he placed glass plates on the seat and back of the empty chair and one on the floor for his own feet and sat down.

"Everything is now ready," he said in a low intense voice. "Watch carefully, especially the glass plate on the subject's helmet." He then placed the transmitting helmet on his own head and adjusted it carefully. He raised the front and placed the sponge electrodes on his temples. "I can see through this screen all that transpires in the sub-

ject's mind," he said in a low voice. "Please do not make any comments or otherwise speak, under any circumstances, to me, as everything depends upon my concentration."

He then closed the helmet with a snap. His right foot then pressed gently on the foot pedal of the controlling pedal and a low hum came from the X-ray cabinet, which was followed instantly by a faint green light, glowing in the glass screen on the little man's helmet. More pressure on the pedal and the hum increased to a high whine and the green light grew brighter and clearer. Then followed the most amazing exhibition ever witnessed by mortal man, an exhibition which held the two onlookers white and breathless from beginning to end.

The green light gradually changed and became a clear image, an image of one side of a small house with a small barn behind. Suddenly the house slid by and the barn came closer and closer till the door of it filled the entire screen. Then the door was opened by a large hand appearing from one side of the screen, and the interior of the barn came dimly into view showing two neat stalls with a cow in each. The cows came nearer and a bucket was taken down from a peg on the wall by the mysterious hand and placed under one of the cows. The hand was suddenly joined by another and the two hands proceeded to milk the cow. The onlookers by this time had realized that the two hands appearing from nowhere were in reality the hands of the subject and what they saw the hands do in the screen was what the subject's mind was recalling under the Doctor's influence, and everything that was pictured was exactly as the subject saw it, with his mind's eye. The picture changed suddenly to what proved to be a room in the farm house, apparently the kitchen, as a stove and a sink with a small pump were to be seen in one corner as was also a bench with a basin on it containing water. The basin came nearer and the hands took up a bar of soap and washed themselves, then the basin filled the entire screen as the subject washed his face, the picture becoming blurred as he dipped his face in the water. The basin with its now soapy water receded and a large towel now obscured the view as he wiped the water from his face.

Then followed animated views of another room in which Sam changed his clothes, brushed his hair and ate his meager supper. Then a hat was reached for and apparently placed on his head, as it passed out over the top of the screen. Next came the front door, the path to the road, the road itself, with its changing lights and shadows. Then a blank and the light faded and the whine of the apparatus ceased as the Doctor released the foot pedal.

For a moment he sat silent, then he spoke through the mesh in the front of the helmet in an awed whisper. "It works," he exulted, "it works, beyond my wildest expectations, as far as I have gone with it. I have had him show us what he has done this evening just before he came here. You must understand that everything you see on the screen is as he sees it through his own eyes. It's a little weird at first but we will get accustomed to seeing things through his sub-conscious mind as we go further. I will now attempt to go a little further into his past."

As he ceased speaking, he pressed on the pedal again and the green light shone for a moment, then it steadied down to a view of the farm house again. With this as a starting point, a series of rapidly changing views next appeared. The farm house grew newer, huge trees appeared, dwindled to saplings and vanished, fields seen near the house changed to woods which gradually grew wilder in appearance and finally the farm house disappeared in the wink of an eye.

CHAPTER III

Into the Past!

IT was evident that the Doctor was getting back through the subject's immediate ancestors, one by one. Then followed a swift blurred whirl of rapidly changing scenes in which no details could be noted, so fast did they appear and vanish. After a little while they slowed down and came to a standstill. The scene presented was a wild desolate spot at the edge of a huge forest, in the foreground of which ran a small stream. The stream came nearer until it filled the entire screen, turning over so that the onlookers could clearly see the bottom of it, with moss-grown rocks strewn over its bed. A hairy hand suddenly reached to the water and entering it began to explore the bottom among the rocks, the water becoming muddy as several of the larger rocks were turned over. Then the hand emerged and was seen to hold a species of fresh water clam or mussel. The other hand now appeared and the shell was twisted open revealing its luscious inhabitant which was unceremoniously plucked from within and carried past the screen, evidently to the mouth of the owner of the hands. Several more mussels were removed from the creek in this manner.

The landscape suddenly whirled in a half circle and the forest came into full view, the scene steadying in an opening between two huge trees. The dark interior of the forest became clearer as the eyes that saw it tried to pierce its depth. At length, with much agitation of the undergrowth, an enormous black and orange striped beast, with a long white fang on each side of its jaws, leaped into view. The *Saber Toothed Tiger*—no doubt the greatest exterminator of man, at the period the subject's mind had reached back to! He stood, a picture of savage splendor, gnashing his murderous fangs, his long tail brushing the ground in a wide semi-circle, truly a terrible sight to the owner of the eyes that were viewing it!

Was he armed or would he flee? The thought ran through the minds of the two who were gazing at the spectacle wide-eyed with terror. The Frenchman grasped the staid Professor's arm, as both held their breath to watch the outcome of this primitive encounter. The tiger's intended victim made up his

mind in a flash. It was realized that split second decisions were all that stood between a safe retreat or a quick finish in those times, when life was only one jump ahead of a thousand such menaces every day. The scenery whirled and in what was probably two or three leaps a tree was gained and the trunk ran rapidly down the glass as the fugitive ran up it. Several limbs appeared and dropped down out of sight, then the upward movement ceased and the man evidently looked down, for the scene showed the lower length of the tree trunk and a section of the ground around it, with a yellow and black tornado raging around and tearing at the tree with his wicked looking claws, rearing up against the huge bole his full length and opening his great jaws in what were no doubt blood-curdling roars. Then hairy hands broke branches from the tree and hurled them downward at the foe, to its ever increasing rage.

Tiring of this at last, the upward climb commenced again and then out on a thick limb, a wild swing through space, a limb of another tree flashed into view and was caught by the hairy hands, a run to the trunk of this tree, out on a branch on the opposite side, another swing, another limb on another tree, again and again this scene was repeated across the screen at lightning speed. Then a sudden stop, a jerky upward glide of the trunk and the ground came into view again; a short walk through an open glade, a climb up a steep slope and a rocky cave entrance filled the screen melting into blackness as the man entered.

A faint red light appearing in the distance, growing larger and brighter until the tunnel opened into a large cave with a big fire in the center, around which were a group of frowsy, skin-clad beings. At first glance they appeared to be huge apes or gorillas, but as they turned their heads to gaze at the newcomer, it was seen that they were human, but very low down on the scale of evolution.

"My God! *Homo Neanderthalensis!*" muttered the Professor, and the Frenchman unconsciously nodded with an awed "*Oui, oui.*"

Beyond all doubt, there before their very eyes, were actually pictured living specimens of that remote ancestor of present day man. Around the fire were bones of all sizes and description, scattered on the floor of the cave; large leg bones of some undetermined monsters, cracked and split, the marrow extracted. At that moment, some had been in the act of eating the marrow, and one old fellow had his hand and half of his forearm inside a huge bone, digging out the juicy delicacy. The one, through whose eyes these scenes were visible, seated himself by the fire and picking up a bone that lay nearby, began cracking it with a round stone.

Sam's Ancestors

THE scene suddenly vanished and then followed another series of whirling blurred pictures, indicating another leap of aeons back beyond the caveman period. When they finally steadied down, an entirely different scene was pictured. A steamy lagoon was shown in a murky light as though from a clouded sky. The eyes that saw it, belonged to some creature, squatted on a rock at one edge of the lagoon. On the opposite shore not far distant, were huge tree ferns, gigantic *Equisetums, Cycad* ferns and kindred vegetation. Long streamers of grayish green moss hung in great profusion from these and the water of the lagoon was covered with a thick green scum. A few insects, similar to the dragonfly of today, except that they seemed immensely exaggerated in size, sailed lazily about in the foggy atmosphere, close to the surface of the water.

"Late Palaeozoic," gasped the Frenchman, "*Mon Dieu*, what next?" A nudge from the Professor quieted him. The scene held steady for a few moments, then the water in front of the picture was parted by a wide, flat head, surmounted by two knobs, in which were set two unblinking eyes. The skin on the top of the head was grayish green and below the frog-like visage, as far as could be seen, the color was grayish white. A ridged back suddenly floated to the surface behind the head and beyond that could be seen a pair of short legs, idly moving in the green water, one on each side of a long thick tail. The mouth opened slightly, showing two rows of sharp teeth. A kick of the legs sent this creature to the edge of the rock up which it clumsily scrambled, to come to rest in full view of the screen. It was seen to have a head, which was a mixture of frog and snake, a lizard-like body and short legs, terminating in webbed feet. Its tail was almost as long as its body and tapered down to a blunt point. His thoughts being collected by this time, the Professor mentally classed it as one of the numerous species of *Polycosaurs* of the Late Palaeozoic Age, a sort of primitive lizard. Evidently the owner of the eyes, that now gazed at this period of early life on our planet, was of the same classification, as they were now obviously crouched close together on the rock, so close, that the beast's breathing could be noted plainly as the slightly wrinkled folds of its throat rose and fell with slow regularity.

This scene held steady on the screen for some time, then the view whirled in a half arc and presented a flashing glimpse of the tangled fern forest behind the pool and centered on a thick waving clump of Cycads, through which a gigantic form with a high ridged fin, extending from head to tail, was crashing directly toward the onlookers. Another instant and the scenery seemed to roll over and over, showing a flash of a purplish gray sky, then a dark, dirty green which grew dimmer and dimmer, finally ending in complete darkness.

Evidently the two on the rock had half rolled, half scrambled to the water, dove clear to the bottom and buried themselves in the thick ooze to escape the mighty jaws of the nightmarish creature pursuing them. The darkness continued for some time, then came again the rapidly changing scenes, which, as the two scientists knew, meant another spanning of the ages by this marvelous invention. Stopping at last, the screen showed only a dim

reddish light, with no details visible at all. A short period of this, then the blurred images sped on again, finally stopping to clear on a lagoon shore, similar to the one shown before (or was it the same one at a different period?) fringed with tall waving grasses and other rank growth, some very like the modern cat-tails and other swamp vegetation. A pleasant landscape of true tree forms showed in the background, the species of which neither of the onlookers could determine. The shore was obviously shown from the water and gradually came closer as the owner of the eyes that saw it drifted into the edges of the cat-tails. Then a scramble through the reeds that lined the shore and as these were left behind, the two men of science gasped at what they beheld! In a large open grassy space, was a group of astonishing creatures. They were somewhat like the modern frog, but different and that difference, they presently realized, lay in the fact that most of these "frogs" were *standing erect on their hind legs*, much as a human being stands. Others were squatting, in true frog fashion, on the ground, but from time to time one of them would rise on the hind legs and walk about as naturally as man walks today.

Both scientists were now quivering with excitement. "Surely" ran their thoughts, "surely if the little man in the chair before them were a throwback, these creatures were undoubtedly the species to which he belonged. The same loose-jointed, swinging stride, the short arms, held exactly as the grotesque Sam held his, the little round paunch, even the features of the face were the same, with the exception, that where Sam's features were a suggestion of the real thing, *here was the real thing!*

Occasionally, one would wander out of sight into the forest of giant trees, picking off a leaf here and there, a berry or two, and even a few insects, conveying them to his mouth with a quick movement of the webbed paws or hands. Then one would walk to the water's edge where the reeds were scattered and dive in with an almost human movement. In fact, but for the grotesque appearance of them, they might have been a group of youths at a swimming hole in the country. It was evident from the wide angle of view that was visible on the screen, that the eyes of these creatures were constructed so that practically the whole 360 degrees were visible without turning the head, as the forest on one edge of the water and the opposite shore of the lagoon were all plainly seen, with the center of the screen being the center of focus. The owner of the eyes seeing all this presently arose, after a time and sauntered toward the trees, apparently seeking food. The forest soon appeared all around the screen and moved past it. Presently it stopped and the view became a blur, out of which appeared an enormous pair of eyes in a snake-like head. Slowly swaying to and fro, the head and eyes came closer and the onlookers had a queer numbed sensation, as they stared into the cold, expressionless orbs, that held them with a hypnotic glare.

They became conscious of a fang-fringed mouth opening below the eyes, but they barely noted this fact, so completely did the eyes hold them in their spell. The mouth opened wider and the whole screen was filled with the gaping jaws, as they sat rooted in a hypnotic state, which was suddenly broken by a swaying, struggling movement of the screen and helmet on the head of the Doctor's subject. The picture was suddenly snapped out and for a moment, deathly silences ensued in the laboratory.

Then the Doctor quickly removed his helmet, placing it on the glass table and lifting the other helmet from the little man's head. As the helmet was taken off all three gasped at what it revealed. The subject lay back in his chair, his face a ghastly greenish color. The features were contorted, with the expression, not of one who had faced death, but with the look of one who had stepped over that threshold. They were the exact features of the creatures, who a few seconds before, had filled the screen with their placid everyday life. The mouth had fallen open and whispering croaks and half formed words, came from it in jerky spasmodic sounds. Quickly the Doctor set to work to restore the poor wretch to normalcy, waving the others aside as they came forward to help. Standing over Sam, directing his tremendous will power into the mind of the little man in silent struggle, hammering his thought forces into the fear-stricken brain, with all the power at his command. It was fully a half hour before the ghastly color and expression began to fade from the subject's face and the rigid body became slowly limp, and finally he returned to a normal appearance.

The Doctor was completely exhausted with the tremendous exercise of will power, great beads of perspiration glistened on his face and dropped to the floor, his own face was as white and haggard as that of a man brought back from the edge of death itself, as he at last leaned back in his chair. His hands trembled and his whole body shook from the powerful strain. But he had won, thank the good God, he had won!

A Successful Experiment

THE other two had stood by, silent and powerless to help in this sudden crisis which had arisen, puzzled as to what it meant. But now they realized, that somehow, the little man had been near to death in his present life, as his ancestors undoubtedly had been in the picture of his distant past. Finally the Doctor spoke: "A close call, a close call indeed! Don't speak, don't ask questions I beg of you, at least not yet. I must collect myself."

Rising, he tottered to a small cabinet on the wall and removing a bottle of blood-colored liquid, poured a small amount in a glass, adding water from the faucet at the sink, and draining it in a gulp. Another small amount was mixed with water and poured down the subject's throat. He then walked unsteadily to the end of the laboratory and

turned the switch that operated an electric fan in the wall, near the ceiling. Immediately a stream of fresh air began circulating through the room, seeming to revive him somewhat, for he returned to the table with a much steadier step and his hands no longer trembled. He sat down and faced his subject, who was now breathing evenly.

"Get up," he commanded. The little man arose instantly, and, at the Doctor's orders, immediately went behind the screen and donned his clothes. When he came out, the Doctor took his shoulders in a firm grip and looking into his expressionless eyes, he said, in a low, compelling tone, "Leave here, go home, get into your house, without awakening, remove your clothes and get into bed. Sleep—sleep—and awake at your usual time in the morning—erase from your mind everything that has transpired since you came here. Now go!"

Sam turned mechanically and walked out of the laboratory. He could be heard ascending the stairs to the first floor, they heard him walk through the house to the front door, open it, step through and close it with a bang. Then silence. The Doctor turned gravely to his two friends and said: "Well, gentlemen, have I proved my theories or not? I think I have, but the ending was something unforeseen. As a whole, though, I think we may call the experiment a success. If you will kindly restrain yourselves from asking questions for a few moments, I will endeavor to outline my deductions of tonight's results.

"To begin with, I first placed my subject under my power, by ordinary, elemental hypnotism, which, no doubt, you saw and understood. Then getting him in a properly insulated position, I applied my Hypnotic Ray to his sub-conscious mind and suggested that he reach back and give me some impressions that his mind had recorded, generation by generation. As you saw, his forebears had lived in the one locality for several generations. Then seeing that everything was working along smoothly, as I had planned, I made him leap back some fifty thousand years, to the Mousterian Age. I was astonished, myself, to be able to reach even this stage of man's development. In going back, no doubt, you saw only a blur on the screen. But, with the mesh in front of the transmitting helmet, I was able to see clearly each stage as it flashed by.

"I won't take the time to tell you all I saw, but, I have no doubt, you can conjecture each phase of it, seeing that it was a perfect panorama of the descending scale of evolution. The Neanderthal scenes were self-explanatory, so, we won't go into the details of them. Keeping him there long enough to be sure of the period they transpired in, I gently urged him further backward as far as he could go, stopping at the late Palaeozoic Age. The results were wonderful, a more astonishing confirmation of the theories of our scientific historians and geologists, could not be imagined. That the sub-conscious mind of the man, who has just left this room, was at one time in the possession of one of the denizens

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We assume that the general story as developed by the author is correct from a scientific standpoint, namely that it *is* possible—which after all it is—to go back in instinctive memories of the past, *so do not look for the fundamental* mistake here.

Do not look for minute imperfections which every story has no matter who has written it. Rather look for something big. It is however necessary to think and to reason, because on the surface the impossibility contained in the story is not at all apparent and you may go over the mistake several times before you catch it.

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All employees of the Stellar Publishing Corp. and their families are excluded from this contest.

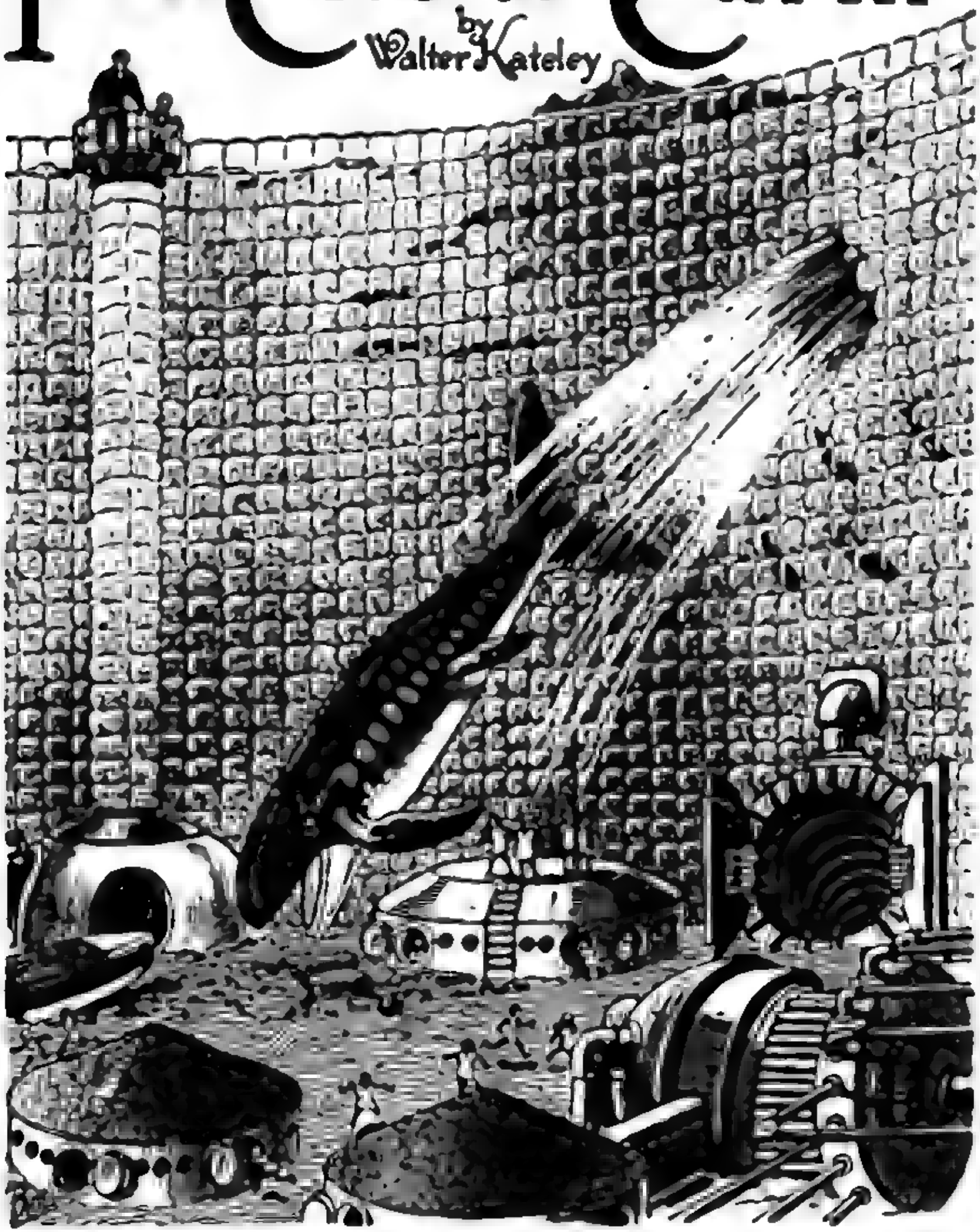
The prize-winning answers will be printed in our January issue, to be issued December, 1929.

Address all letters, Editor, Fundamental Error Contest, c/o SCIENCE WONDER STORIES, 96-98 Park Place, New York City.

(*Concluded on page* 459)

From Eros to Earth

by Walter Kateley



Coming on with the speed and force of a projectile, it struck the hull wall squarely—head on. So tremendous was the force of the impact that the compartments gave way like a rope of sand.

EROS TO EARTH

THERE could be no doubt about it.

It was a giant loud-speaker shell.

As I peered through the water glass, and tried to hook the great gastropod with the bent prongs of my sponge pole, I had a fleeting vision of how noble it was going to look mounted above the cabinet of my receiving set at home. My ear of fancy caught a resonant note of the music that would be brought in through this, Nature's own amplifier, when it should be cleaned and polished and the loud-speaker mechanism attached.

The mollusk was fully eighteen feet under water, at the very limit of the reach of my pole; besides, my somewhat unskilled manipulations of the pole sent up such turbid clouds from the sea bottom, that I had great difficulty in seeing what I was doing, in spite of the crystal clearness of the water.

At length I succeeded in slipping the prongs under the great shell, and lifted it from the bottom. I hauled up slowly and with extreme caution. I held my breath in the fear that the prize might roll off the prongs and yet be lost. When it was still a foot and a half below the surface, I plunged my arm into the water and grasped the small spiral end of the shell and hoisted it into the boat.

It was a gastropod of the tulip family; the most magnificent specimen I had ever seen. I judged that it could be no less than twenty-five inches long. It was remarkably heavy, and the coloration was truly wonderful.

For some time I sat gloating over its great size and beauty, and planning how to evict the creature tenant, who was now withdrawn so far into his quarters that he was scarcely visible. Had it not been for its great weight, I might have imagined I had an empty shell.

I was well pleased with my morning's adventure as I laid down the great shell, at last, and cast my eye over the surrounding seascape.

I had left one of the Florida keys in my motor-boat, in search of a place where I had been told was a rich fishing-ground for curio seekers. The old sponge fisherman who had told me about the place was enthusiastic about its treasures. I could not be sure that I had taken the proper course, since I had been somewhat confused by the darkness. But it was no matter. I had manifestly come to a good place.

Away to the north was a little low lying island; and, with my glasses, I could make out a colony of snow-white herons perched in a thicket of low bushes that hung out over the water.

These herons, save for a couple of lazy pelicans flapping low over the sea, were the only signs of life as far as the eye could reach.

Away to the west, I judged, must be the Dry Tortugas group of islands; and somewhere in the direction from whence I had come, must be the lowlying coast of Florida.

But why think of land, when the sea was so beautiful as now?

To the south I could see beautiful, dark blue areas that denoted deep water. But, in the main, the sea was of that dreamy, translucent, sun-bathed, light green that makes the shallow tropical seas so inviting to the eye. Here and there in the distance, like ornaments decorating the bosom of the sleeping ocean, were lines of sparkling foam.

WALTER KATELEY

This is a phenomenon which, while perfectly natural, is so charming that it always seems like some form of enchantment. Here and there the limestone bed of the sea rises in flat table-land nearly to the surface, leaving the water so shallow that it cannot support the little rolling waves that constantly and almost imperceptibly steal silently over the surface of deeper waters. So, when the waves reach these shallows, they break in long lines of crystal white sparking spray. Often the line of progress of the waves is somewhat diagonal to the edge of the flats. The white spray will leap up at one end of a wave for a space perhaps a rod or two in length; and, merrily scampering along the full length of a long wave, disappear like a phantom; just as another one springs up in its original place and scampers after it.

Or perhaps there will be three or four such outbreaks, sportively chasing each other over the surface of the water. One does not see the shallows, nor does he perceive the waves.

It seemed as though these little fairy creations were springing up from the deep and playing their pretty, sprightly games for my own delectation; since no human eye save mine was there to see. As I gazed enraptured, I reflected on the aptness of certain lines from the Chambered Nautilus:

"In gulfs enchanted—where the siren sings
And coral reefs lie bare;
Where the cold sea-maids rise to sun their streaming hair."

And, catching the sound of the clear tinkle of water where the waves were breaking. I imagined that the sound waves came riding along on the surface of the sea; while other

HERE is another interplanetarian story of a different sort. Mr. Kateley is a first-class scientist, who not only knows his science, but knows how to apply it in an interesting manner, so it can always be followed easily. In other words, the author, without trying to, gives us a scientific education in easy stages.

We hope Mr. Kateley will not fail to give us a sequel to this absorbing story.

lines from the poem drifted through my mind:—

"From thy dead lips a clearer note is born
"Than ever Triton blew from wreathed horn."

Just what was a Triton? I wondered dimly, as my eye again wandered back to my prize shell.

Then I recalled that a certain large twisted seashell, not greatly unlike this one, was called a triton. I had taken this to be a tulip. Could there be any connection between the clear note of a triton and the idea that such a seashell possesses almost supernatural powers as a loud speaker?

I was conscious that the peace and quiet of the surroundings, together with the warm glow of the February sun, was making me sleepy. In fact I had had little sleep last night, starting my journey shortly after midnight in order to have a long day in these shallows. I decided that I would have one more look at the sea-floor and then perhaps take a little nap.

And Has A Strange Experience

I LOOKED over the side of the boat into the clear water, shot through with the rays of the sun. How clear the shadow of the boat showed, as it tunneled through the water and ended in a patch of gloom at the bottom!

Then something on the surface a few rods away caught my eye. It was something just a little darker than the water itself. At first there was only a short stretch of it. Then it lengthened at both ends, to a half circle, and then rapidly became nearly a whole circle, with me as its center. It puzzled me.

Could it be that I had drifted into a coral atoll, and that the receding tide was now revealing its characteristic circular contour?

No, it could not be that. There were surely no coral reefs this far north. The bottom of the sea and the islands in this region were all known to be of limestone formation. Well, I am of a curious nature. I decided that I must investigate.

I started to pull up my anchor, when suddenly I saw some object, some strange-appearing creature, rising to the surface directly in front of me. I quickly shaded my eyes with my hand, to cut off the wavering reflections of the water, and the object assumed shape; that of a small boy standing upright on an oblong float.

The tropical seas are full of wonders; and the strange and oft-times weird sights I had seen in the last few weeks had rendered me quite inured to surprise. One comes to believe that these tepid waters may yield almost anything. Nevertheless, this apparently human being far out at sea, calmly rising from the depths, seemed so wildly impossible that I doubted my own senses. Could this be some manlike animal, whose image was so distorted by the waters' deflection, refractions and reflections as to cause an optical illusion?

No, it was real. As it approached the surface it became more distinct. Beyond doubt, a human being!

Had he swum from some boat, from some submarine, from some new marine invention?

I gave a swift glance around to make sure there was not some boat near by; although I knew that only a moment ago I had been scanning the whole surrounding seascape, and had seen no boat or craft of any description.

The strange creature broke water scarce twenty feet away, popping up like a jack out of a box, and the float coming to a sudden halt while still slightly submerged.

The newcomer was turned somewhat away from me, as he threw up his arms to balance himself in his upright position. Having established his equilibrium, he turned to the boat with an air of perfect self-possession. But to my surprise it was not a boy who surveyed me and my craft, but a man of manifestly mature years.

In spite of his small stature, (he was but a little over three feet high)—there could be no doubt that he was fully grown. His body and limbs were well rounded and muscularly developed in a way that precluded a suggestion of immaturity. Furthermore, his facial expression indicated an entirely normal state of mentality. There was a total absence of that indefinable something, that illusive expression that you seem to half-see and half-feel, which invariably betokens the victim of arrested development.

He was evidently a man of fairly grave demeanor; but his face relaxed in a genial smile, and his voice reflected respectful cordiality, as he addressed me without hesitation. Evidently, he had been fully aware of my presence for some time; for he gave no sign of surprise upon turning to me, and his first words were indicative of forethought.

"I come to welcome you to our colony. You are now within the village of the people of Eros," he said in perfect English, with the careful selection of words and the studied exactness of diction that revealed a lack of easy familiarity with the language.

As he finished speaking, he waved his hand comprehensively indicating the surrounding ring.

I suppose I stared at him blankly; so sudden was his appearance, and so altogether unprecedented the manner of his coming. But my astonishment quickly gave place to a feeling of amused interest, and I made haste to return his evidently well-disposed greeting.

"This is something of a surprise," I said. "But I can assure you that I appreciate your hospitality. Will you come aboard? I will throw you a line."

I tossed him the end of a small coil of rope, which he caught and held as I pulled him close to the boat.

"My name is Gort," he said by way of introduction, as he stepped into the boat and extended his hand. "I am leader of a little expedition from the asteroid Eros."

"My name is Kingsbury," I rejoined as I shook

hands with him; "and I am at present a loafer on the face of the earth."

CHAPTER II

And Descends into the Sea

FOR a moment he stood looking up at me with an expression of profound interest.

"You must excuse me," he said at length somewhat apologetically, "if my deportment and language do not seem altogether correct; for your customs are of course quite different from ours, and this is the first time that I have been privileged to meet an inhabitant of the Earth."

"Do you mean to tell me," I asked incredulously, "that you are from another planet,—from the planet Eros"?

"Yes, it is true," he said gravely. "We are from the nearest asteroid of the solar system. I have gathered from your literature that your people call it Eros. However, we call it 'Miani'".

"But how does it happen that you speak English, when you have not even seen a human being before," I asked, still incredulous.

"Well, that is really quite a long story," he replied with the utmost frankness; "and I shall be glad to explain it all to you. But first, I wish you to see our little establishment, and meet some of our people. Then we can talk at our leisure. We have quite a little village here entirely submerged at present, but capable of being brought to the surface.

"Now, if we may have the honor of entertaining you as our guest for two or three days, I can assure you that we will make every effort to make your stay pleasant and instructive. I sincerely hope that you have the time at your disposal; and that you will repose sufficient confidence in my assurances of good faith to permit me to commence the necessary arrangements for your visit."

"I am indeed deeply interested in what you tell me, and since I am on a somewhat prolonged vacation, I am glad of an opportunity of visiting your village," I replied; trying to hide a note of jocularity that I felt sure was creeping into my voice. For I could not but feel that the whole thing was some sort of a hoax.

The little man beamed with satisfaction.

"Then if you will excuse me for a moment, I will attend to the matter of having the water lowered," he said. And stepping over the edge of the boat, he descended into the sea. I saw his form pass over the edge of a near-by ledge, and disappear in the depths of darker water. He swam with the ease and speed of a South Sea diver.

Left alone, I took thought to my strange situation. Was this a reality? Would the little man come back, or was it all only a dream? Had I merely fallen asleep? I rubbed my eyes and looked about me.

Yes, there was surely the wide ring encircling the boat; and there was the float that the little man had arrived on. I wondered why, since he was such an accomplished swimmer and diver, he had bothered with the float.

It was merely a matter of independence and dignity, I concluded. He had felt that he could make a much better impression from his own craft, standing upright, than as a partially submerged swimmer.

He had been gone but a few moments, when I saw him again rise out of the deep water and approach the boat. He came over the side with easy agility.

"I have here a pouch of almost clear oxygen that I can draw on in case of need," he said; turning back the top of his bathing suit and revealing an inflated pad with a tube attached.

"Now while the water is being removed, we can talk," he said seating himself on a camp-stool that I placed for him. "In the first place, I should explain that this ring you see all about is the top of our water wall. It is a sort of collapsible caisson. It is made up of a great number of intercommunicating aircells, that become rigid when inflated, and acts as a circular dam to hold the water out when the water within the ring has been removed. I have had the pumps started, and you can now see the water level slowly sinking."

And such was indeed the case. The ring assumed the appearance of a translucent wall, extending perhaps a foot above the surface of the surrounding sea. More and more of the wall continued to appear. It seemed to be made up of small sections that were almost transparent and nearly colorless, although a little lighter than the water.

"These compartments of the wall are made of a very light but tough material, somewhat like your own artificial silk or rayon. It is thoroughly waterproofed; and each compartment is supplied with a safety valve, so that it will not lose its air in case its next neighbor collapses. It is quite surprising how rigid it becomes when completely inflated."

"How much pressure will it withstand?" I asked.

"Well, we have had no difficulty with it so far; and were able to bare the sea floor here, where it is nearly twenty feet below high tide," he replied. "If you feel any anxiety about the safety of your boat, I can have it removed to the outside, as soon as we are safely housed within our stronghold," he continued reassuringly.

"The only time there could be any danger of the wall giving way would be in case of a severe storm; and when it is up we always keep a weather lookout posted."

By this time we had descended several feet.

"We have located our main citadel over the side of this ledge, in about twenty fathoms of water, in order to be safe in the event of a severe cyclone," he explained.

"We are staying here the year round, and in the summer months these waters are often swept by terrific winds. Then a retreat to deep water is our only means of safety. At this higher level we have established some work shops and laboratories, most-

ly experiment stations; and here we do a good bit of work during the winter months. It is more pleasant to be out of doors and in the open air in this delightful climate.

"Our out-door shops are only roofs to keep the sun and rain off. The roofs will commence to emerge from the water directly, and the mechanism you see appearing here on the right is our power plant. We use power extracted from the sun's rays to operate all our pumps and other machinery. We must take care to find a smooth landing place for the boat," he went on after a moment. "If it settled on sharp rocks it might be injured." Then he looked at me with polite curiosity.

"I hope you will pardon my asking about your vocation; but are you a scientist, or a fisherman?"

"No, I am neither fisherman or scientist when at work," I replied. "I am regularly employed as an examiner in the Government Patent Office. My work consists of examining technical devices. But when I go on a vacation, I become an amateur naturalist and fisherman."

"Well, I am glad to know that you take an interest in scientific things," the little man rejoined; "because our work here is of an entirely scientific nature. And it will no doubt interest you, and you will perhaps be able to throw some light on things that to us are still shrouded in darkness. In my own country I am assistant secretary of education. Our department directs the activities of the school system, and engages in research work for the good of the community at large.

"As head of this expedition, I am called the tezarch; a word that denotes an educator and a director of research. In the organization we have twenty people in all. There are six metallurgical experts, three germ specialists, and a number of others chosen for their proficiency either in mechanical or scientific lines; and three of us are accompanied by our wives.

"But now the water is getting so shallow that we must attend to the landing of the boat"; and he stepped into the now shallow water and pushed the boat away from a jagged outcropping of rock.

"I have neglected to say," he resumed, "that this happens to be one of our days of rest and recreation. At home we work eight days and lay off three. Here we have not been able to observe this custom very rigidly, but only in a general way. This is the entrance to our stronghold, now appearing at the edge of the shelf."

And Enters A New World

THE boat now came to rest on the ground, and soon the surface was so drained that we were able to walk on fairly dry ground to the entrance to the "stronghold." This was a large tube, evidently constructed of metal. It extended downward at an angle of about 45 degrees, and was fitted with a narrow set of steps.

"I fear you will find it rather close quarters," said Gort, the tezarch, preceding me into the stairway.

"You are something of a giant, compared with us."

"You will notice," he continued, "that here is a chamber at the entrance to the passage, closed off by two sliding doors. This chamber is normally filled with water when the coffer dam is down. We enter it and close the outside door. Closing the door starts a motor operating a rotary pump that empties the chamber in a few seconds. Then we open the lower door and descend the steps. As we close the inner door behind us, the outer door automatically opens. When the dam is up, we have both doors open, thus making an ample air passage for ventilating our quarters. Otherwise we depend on an air hose carried to the surface by a float for our supply of oxygen. This necessitates the use of an air pump and ventilating fan. In times of great storms, we are obliged to extract air from the water, by the use of a mechanism patterned after the gills of a fish."

As he talked we descended the long passage way, and arrived at a level landing at the bottom. He opened a small door, and we entered a sort of vestibule or antechamber.

"Excuse me a moment," he said, "while I get out of this bathing suit and put on a kulden."

He shed his brief bathing suit with one deft movement, and produced another garment from a cupboard. It was only a wide strip of some thin cloth of a soft texture. There was a hole in the middle of it. He dropped this over his head, letting the two ends hang down in front and back. The strip was a little wider than a man's body. He fastened the two sides together at either side of his waist with a fastening that resembled a glove snapper.

"Now I am properly clothed," he said. "This is the usually accepted costume of Eros. In times of inclement weather and in the more severe climates we, of course, wear other garments, and longer and heavier kuldens. Now I will show you where we live."

He opened another small door, and we entered a fairly large and well lighted room. Two women and a man were seated at a table.

All rose when we entered, and one of the ladies advanced to meet us.

"This is my wife," said my guide and he introduced me to the lady, who received me with the most gracious manners.

"We deem it a great privilege to be able to entertain you," she said; but she pronounced her words hesitatingly and with apparent difficulty. It was evident that she was not as familiar with our language as was her learned husband. The other two proved to be the tezarch's secretary and his wife.

At the suggestion of the tezarch, other members of the party were called in and introduced. Few of the others were able to speak at all conversationally; but they had all been thoroughly drilled in the matter of salutations and proper modes of earthly greetings.

The ladies wore the same pattern of garment as

the men; but theirs were made of somewhat finer material, and were tied on either side in two or three places with bows of tastefully selected ribbon.

Besides this garment, the women and some of the men wore sandals, but the others were frankly barefoot. The women were only a little smaller than the men. The leader proved to be about the average size among the latter.

As the tezarch had said, there were three women of the party; and although all were apparently of middle age, they all showed a quickness and grace of movement and a vivacity of spirit that rendered them quite charming.

Light refreshments were served shortly after my arrival; and after that the tezarch invited me to come to his study, that he might tell me the story he had promised.

Needless to say I was consumed with curiosity to know how this strange people had arrived from their planet, and for what purpose they had come; and especially how they had learned to speak our language.

And Hears the Tezarch's Story

"NOW," said the tezarch, as he placed a table in lieu of a seat for me and composed himself in a tiny easy chair, "I will tell you of the other world and of our work; and then I hope that you will tell me a great many things that we wish to know. But in order that I may not bore you with unnecessary details, I wish you would tell me in a general way how familiar you are with our planet Eros."

"Well," I said, "that will take me only a moment; for my knowledge of Eros, and I think I may say all earthly knowledge of the planet, or as we say, asteroid, is very sketchy. I have been trying to recall what I have heard of the body, since you told me you came from there.

"For some time our astronomers have known that there were a great number of little planetoids, following singly or in groups more or less well-defined orbits around the sun. These orbits are outside the Earth's orbit, and also for the most part outside that of the planet Mars. Mars also has an orbit larger than the Earth's, and is the next-door neighbor, in point of space, on the side opposite the sun, as Venus is on the side toward the sun.

"A great many asteroids—I might say several hundred—have been observed and recorded by astronomers. But Eros, which is supposed to be the nearest of all, was not discovered until about fifty years ago. Because of its relatively small size in the solar system; it has never been dignified by the name of planet. It is of especial interest to our astronomers because of the shape of its orbit.

"At perihelion it approaches the sun more nearly than does the planet Mars; and also, on occasions, approaches the Earth closer even than the planet Venus, which was heretofore recognized as our nearest celestial neighbor.

"On account of its nearness, astronomers have found it a convenient medium for determining various interstellar and interplanetary measurements. It is especially useful in determining our distance from the sun. Further than this, we know nothing of your planet."

"Well, that will do very well for a starter," said the tezarch with a tolerant smile. "It is, as you say, a body of about the same general composition as the earth and doubtless had an origin similar to that of the Earth. And the temperature and climatic conditions are not greatly unlike yours here.

"We have a population of around three millions, and our history extends somewhat further into the past than does yours. We all speak the same language, and have one centralized government. Our religion is made up largely of ancient tradition and supposedly divine revelations; and its precepts embody common rules for just and moral behavior: the same, I presume, as all of your various religions.

"In scientific lines we have made gratifying progress, especially in the mechanical branches. I think that our very presence here would justify me in saying that in mechanical lines we are in advance of your people. But I have reason to believe that you have made great progress in other lines in which we are deficient. And now I will take up the manner and reasons for our coming to Earth.

"In the first place, you must know that Eros is very poorly endowed as regards many of the most useful metals; iron, copper, gold, etc., and also in building stones, such as limestone and marble. Now from a spectrum analysis we have long known that the earth was rich in these things.

"About a century ago, our people discovered that once in about a decade a small asteroid passed very near to Eros, going in the direction of Earth; and after a period of some two and a half years it returned; again passing near to our planet; after which it departed for parts unknown.

"As our astronomical instruments became more perfected, we were able to follow the course of this asteroid; and we found that it did indeed approach very close to the earth, apparently passing between the earth and its satellite.

"We began to hope, at first only dimly, that sometime we might be able to utilize this asteroid as a means of travelling to the earth. For although this little asteroid is only about a quarter of a mile in diameter, yet it moves with great speed, and the fact that it reflects very little sunlight renders it practically invisible to the unaided eye on Earth.

"Some forty years ago, when I was a mere boy, a machine was invented which could overcome the force of gravity and rise beyond the reaches of our atmosphere. So the next time the little asteroid came by, a party of adventurers set out in the new machine and succeeded in landing safely on its surface. (By the way, we call this asteroid 'Jungel'. Since it has such low visibility, I doubt very much if your astronomers have ever sighted it. It does

not approach Earth as closely as it does Eros.)

"Our party were not only able to land on Jungel, but were able to take off again. They returned home with glowing tales of their trip. Preparations were at once commenced for a trip to Earth at the next appearance of Jungel; and in the early part of this century a party made the passage to Earth.

"They landed on an uninhabited island in the Pacific Ocean, where they suffered great hardships on account of incomplete equipment; and they were glad to get back to Eros, when the asteroid reappeared. I have neglected to say that they made use of a great parachute, which was entirely effective in enabling the machine to reach ground safely.

"At that time I was in school, a very young man; but I was deeply interested in the accounts the voyagers brought back of your Earth, and I resolved that, if possible, I would make the trip a decade later.

"After leaving school, I took up research work and made such progress that I was soon offered a position with the government. In 1917,—of course I have been speaking in terms of your time throughout,—I was allowed to accompany an expedition to Earth.

CHAPTER III

The Tesarch Comes to Earth

"WE landed somewhere in the Sargasso Sea regions. Our equipment was so limited that we were unable to determine our exact position, and we had great difficulty in keeping our machine afloat. Our machinery was injured in landing, and we had so few facilities at hand that our two years' stay was largely taken up in contriving repairs. We did, however, make quite an extensive study of marine life; and we secured a great many specimens to take home for further examination and study.

"But most important of all, we found afloat in the weed a large book case, that must have been carried away by some cyclone that had wrecked a ship; for it was filled with school books. The greatest prize of all was a Webster's Unabridged Dictionary; and this book has been our key to the English language. Among the text books also was a small handbook containing instructions for making radio receiving sets.

"Well, we took all these books back to Eros with us. Soon a number of us set to work to learn to read and speak your language. This was more of an undertaking than you might at first suppose. You must remember that we had never heard a word of your language spoken, and were quite unfamiliar with your alphabet. However, as you know, there is an excellent guide to pronunciation in the first part of the dictionary, with very distinct illustrations showing the positions of all the organs of speech in the production of all the sounds. From this we learned to pronounce all the letters and combinations of letters used in the language. Thus we became able to pronounce any word, although we might not know the meaning of it.

"Then in the back of the same work is a very comprehensive collection of illustrations; and under each is the name of what it represents. Thus we secured enough nouns to make a good beginning; but for words denoting action and state of being we were not so fortunate; but we did find some in the primary readers.

"For instance, in the first or second readers, would be a picture of a boy running, and a line of the text would say, 'The boy runs'; and knowing that 'boy' was the noun it was easy to deduce that 'runs' must be the word denoting action, and its meaning was very clear. But there proved to be only meager supply of such pictures, and for a time we made little progress. Meanwhile some of our scientists had been giving much attention to the book on radio construction. They finally succeeded in constructing a receiving set that picked up programs from your stations. Then from hearing the spoken language, we made rapid progress.

"The study of primary English was introduced in many of our schools and colleges, and clubs were organized to learn and speak the language. I spent nearly all my time perfecting myself in the use of the language, and how well I have succeeded you may judge for yourself."

"You surely have acquired a wonderful command of English," I said admiringly.

"There are two reasons why we have refrained from visiting any inhabited portion of your planet," he continued pleased by my compliment, "In the first place, we are very inferior to your people as regards physical ability and you could easily overpower us and confiscate our machine and equipment.

"Our conquerors might imagine that we contemplated conquest, and we might be imprisoned or put to death as public enemies. Or some religious superstition, that we know not of, might brand us as envoys of the evil spirit; and we would be dealt with accordingly. We know that your people are very much given to wars and violence and bloodshed; whereas we have always been very peaceful and know nothing of the art of war or the science of fighting.

"In the second place, our people are comparatively free from contagious disease; and if we were to mingle with the people of Earth, we might become a prey to many of your contagious diseases, and on our return transmit them to our own people, and thus create immeasurable inconvenience and suffering. So we have consistently followed a policy of isolation and aloofness."

"But now you have thrown discretion to the winds and taken me into your midst; blood-thirst, disease germs and all," I ventured humorously.

"Yes," he replied. "When you were observed alone in your boat, we held a hasty conference and decided that the possibilities for good in making your acquaintance so far outweighed the chances of disaster that it would be the part of wisdom, to say

nothing of a gratification of our curiosity, to invite you."

"Well, I trust you will never have occasion to regret it," I said; "but tell me; what scientific work are you engaged in here"?

"Oh, yes; I was coming to that," he nodded, resuming his theme. "As I have said, our planet is very poor in most of the useful metals; while the earth is abundantly rich in most of them. Now, on account of the great distance to be traversed, it would manifestly be out of the question to undertake the transportation of any considerable quantities of these treasures to our planet. But we have hoped to find how they have been produced; what substances have gone into their makeup, and how their molecular and atomic combinations have been formed.

"We have suspected that the process of forming these metals might still be going on here, since they seem to be so plentiful; but we have made no appreciable progress. As yet, we have labored in vain.

I Lend a Hand

"WELL," I said reassuringly, "you must not be so easily discouraged. You are on the right track. These deposits are still in the making; they are being made every day."

My companion regarded me or a moment with wide-eyed astonishment.

Then, as if doubting his own ears, he said eagerly, "I hope that in spite of my incomplete understanding of English, I get your meaning correctly. Do you say that iron and limestone and such products are still in the process of formation?"

"Yes," I said, "such undoubtedly is the case. The formation of limestone is going on all around you and beneath your feet, at this very moment."

He sprang to his feet, beaming with pleasure.

"Let me call in my stenographer and secretary. This is an important announcement; we must have a record of your statements."

"Why certainly you may keep a record, if it can be of any value to you," I said. "But I fear you are a bit too hasty in your conclusions. These processes are going on naturally, but so slowly as to be almost imperceptible, and therefore of no immediate industrial value. Still, I will gladly tell you what I know of the processes. Possibly your advanced science might find some use for the knowledge."

"Yes, yes," he said eagerly; "I am sure we can make use of the information."

He stepped to the door, and called something in an unknown language, and his secretary and a young man with pad and pencil responded.

"Mr. Kingsbury is telling me some very interesting things, that I would like to have you hear, and that I would like to have made a matter of record," said the tezarch busily; and then to me:—"I hope I am not disconcerting you with my enthusiasm in this matter."

"Not in the least," I assured him; "I only regret that I may have excited your hopes, only to disappoint you. But tell me; how did you suppose that the original deposits of minerals in Eros and Earth were formed?"

"The generally accepted theory," he replied, "is that the planets were originally in an incandescent state; and that the intense heat extracted these deposits from the various elements by a process of fusion. Gradually the exteriors of the planets cooled off; the heat receded to the interior, and as time went on, various forms of life appeared on the surface of the planets; and, when at length, man arrived, these deposits of metals waiting to his hand, were millions of years old."

"Yes," I said, "many of our scientists used to hold that opinion, and it was a very good theory; but it was mostly theory."

"I suppose that you are no doubt familiar with numerous kinds of bacteria and microbes"? I enquired.

"Yes," he said, "we thought we had made quite an exhaustive study of them, and of how they cause disease, fertility of the soil, fermentation and such things. Of course, it is a deep subject and no doubt we have much to learn."

"Yes," I replied, "it is a deep subject; and our scientists have only learned enough to barely whet their curiosity. But it so happens that two or three of our ablest bacteriologists have given some attention to how iron, limestone, gold and a few other kindred substances are formed; and their story is something like this.

"Most of the rock strata which form the outer crust of the earth contain iron, gold, lime, etc.; not free, but in combination with other substances. These rock formations are constantly undergoing disintegration. Were it not so, we should have no soil. In practically all surface waters there are traces of acids as carbonic, nitric, hydro-chloric, etc. These acids attack the rock, slowly tearing them down and causing so-called rock decay. Thus the metallic and other compositions are dissolved in the water, and held in suspension. The ocean, the rivers, the surface and subterranean waters are permeated with them."

"Yes, we have found it so, in testing the sea water of both Eros and Earth," agreed the tezarch enthusiastically.

"And now comes the part of the microbe," I continued.

"The Photo-micrograph has revealed a number of ferric microbes; and scientists have called them such names as *crenthrix polysporia*, and water pest bacterium. Some of the larger and more important ones, known as thread bacteria, are reproduced by swarm spores. Some of the lower forms are spherical and rod-shaped, and reproduced simply by cell-division.

"The thread bacteria are made up of many individual cells, and assume various shapes; some look like a bundle of hairs, slightly enlarged at one end and others look like links of a chain, and still others like the turns of a rope.

"Wherever there is water containing even a trace

of iron in solution, these little workers are found; in springs, in subterranean streams, lakes, ponds, rivers, the ocean, in wells; even in the pipes of the water system of our great cities.

"In fact, in the water systems, they prove more or less troublesome; depositing such quantities of ferric hydroxide that they often cause great turbidity, and are known as water pest bacteria. Some forms of this bacteria exist in water that has only two parts of iron in a million."

Gort who had been listening with rapt attention nodded as I paused.

CHAPTER IV

I Deliver A Lecture

"CULTURES of these microbes have been placed in solutions containing iron," I continued, "whereupon they straightway proceed to deposit ferric hydroxides and other iron-bearing salts. They are not very large, the most common size being about two micra in diameter, and seven or eight micra long.

"I am a native of the state of Minnesota; a state that is very rich in iron ore, having some of the largest deposits in the world. These deposits are not deep down in the earth, but are at or near the surface; indicating that they were formed on top of the earth, although no doubt under water. There are a great many separate deposits; although often the individual lodes are so close together that they merge into one another. The characteristic shape of these deposits is in the form of a lens; convex on top, and either circular or slightly elliptical.

"It is quite conceivable that the organisms that deposited these stores lived in circular colonies, much the same as ants do, although, of course, on a tremendously larger scale. As time went on, these colonies consumed the iron solutions, assimilating the needed substances and discarding the iron. The iron sank to the bottom and there formed a circular mound, which naturally spread in circumference as it grew in height. Thus countless millions of tons were deposited in a comparatively short time, geologically speaking. Something of the same process is going on all around us in these waters, as regards the deposit of limestone.

"You have perhaps noticed that the bottom in these tropical seas is often covered with several inches of a light-colored ooxy mud. It was formerly supposed that this mud was brought out from nearby rivers and by ocean currents. But more recently it has been found that it is constantly being deposited by microbes, from the sea water; and upon careful examination, a cubic centimeter of the mud has revealed the presence of some 160,000,000 of these so-called bacteria calcis. These denitrifying bacteria precipitate such enormous quantities of this chalky mud, which is largely calcium carbonate, that they are coming to be recognized as the most important constructive geological agent; even rivaling the coral polyps in the magnitude of their performance.

"This white mud quickly solidifies into limestone; and becomes new land formations. All these submarine platforms; the Florida Keys, the Dry Tortugas and the Bahama Islands are largely made up of these deposits. In fact, these minute organisms take part in much of the metabolism of the sea. They furnish a large part of the material with which the gastropod builds his shell, and with which the smaller marine crustacea clothe themselves. Without these bacteria, there could be no coral reefs; for they furnish the cementing material to bind the dead skeletons of the coral polyps together to form coral rocks.

"Bacteriologists have planted cultures of these organisms on agar, and observed their performance. They appear under the microscope as very minute white particles, somewhat globular in form. Colonies mature in a single day; and proceed to deposit minute spherical grains of calcium carbonate. Presumably the depositing of building stone is only a by-product of the life processes of these microbes; but from a geological point of view it is a very important by-product."

I looked over at the terarch's assistants to see if they were getting my lecture, and they both nodded enthusiastically, bobbing their heads in unision.

"As regards the depositing of gold, we are not so well enlightened." I continued expansively, "However, we do know that practically all sea water contains gold in solution. Some localities contain more than others. Scientists have succeeded in extracting this gold from ocean water. The process has never been so perfected as to make it of commercial value; which is indeed fortunate for those countries maintaining a gold standard for monetary values.

"It has also been determined that microbes play an important part in the precipitation of pure gold; but just what the method or purpose of this process is, still remains largely a matter of conjecture.

"Fancifully minded people have imagined that the little denizens of the deep carry gold around in their purses as a medium of exchange, or wear particles of it as ornament; and that the larger deposits, such as nuggets, are monuments erected to the heroic dead. But this is becoming a rather long dissertation on my part; and while all these details about microbian activities may be interesting, I doubt if they can be made of any practical use to you and your people."

I Am Photographed

THE little man sat motionless for a moment after I ceased speaking. He seemed to be lost in thought. Then his expression again became animated, and he spoke with enthusiasm.

"The poetic fancy about the gold microbes is altogether charming," he said; "but the scientific discussion of the functions of the other microbes seemed truly wonderful to me. It is, in fact, a revelation that is undoubtedly many times worth the long trip from Eros to Earth. It is really no flattery to say that we shall always deem it a kind

Providence that prompted us to make your acquaintance. And you are not a scientist?" he said, quizzically.

I shook my head. "Well then, I wonder what a real scientist would have told us," he finished with an engaging smile.

"I am glad that I have been able to tell you something of interest," I replied, "because your little establishment here and your story of your own planet have interested me more than I can tell."

"I am confident that we shall now be able to produce abundant supplies of iron and limestone on our own little planet," said the tezarch with enthusiasm, "because we have already determined that our waters are rich in these elements; and no doubt all we lack is sufficient quantities of the depositing microbes. And that deficiency can easily be overcome; because we can transport microbes from here, now that we know of their existence and what they are like. Besides, we must have some of them there now, because we have some small deposits of both iron and limestone. Yes, we had better make sure by taking enough from here to start cultures at least."

"But," I said, "I am afraid you misunderstand me. These deposits that I speak of have not been laid down in a few months or years, but their formation has required centuries; thousands, perhaps millions of years; an infinite length of time, as compared with the life of a man or even with the duration of our present civilization!"

"No, I did not misunderstand you," he said reassuringly; "but I did fail to mention a circumstance that I must explain before you can understand my optimism. Our scientists have gone far—in fact, very far in speeding up the life cycle, and the vital functions of nearly all the animal microbes and bacteria with which we are familiar."

"Yes," I agreed, "I can readily believe that; because our people have made some little progress in that line. I was reading only last week how the metamorphosis of a polliwog had been so speeded up by thyroid gland treatments that the transition from polliwog to frog was accomplished in a small fraction of the time ordinarily required."

The tezarch nodded.

"We have been able to crowd the development and life work of several microbes, who ordinarily live several weeks, into as many hours," he went on hopefully; "and no doubt the same results can be accomplished with these."

"But what does it matter," he resumed after a pause, "if it does take years and even centuries to accomplish a great work? The scientist does not work for his own generation alone, but the fruits of his labors are left as a legacy to all coming generations."

"May I ask you," he said finally, "to allow the photographer to take your picture? Upon our return, I am sure the people of Eros will be curious about the appearance of the amateur scientist to whom we are indebted for so much useful information."

"I shall feel highly honored in having my photograph carried to another world," I replied.

The photographer appeared, and took a snapshot with a camera that looked more like a flashlight than a Kodak.

"And now I must show you over our establishment here," said the tezarch. "You will no doubt be interested in our sun-power plant, and in the interplanetary voyaging car. We are in the car now. This little room becomes the chart room when we are enroute; and the room we visited when we first entered becomes the main saloon. Come below, and I will show you the governing mechanism."

The little man then took me on a very interesting tour of inspection. Of course, I was unable to understand the details of the mechanism, or the nature of the power they derived from the sun's rays. From what the tezarch told me, I gathered that the power was in truth a peculiar manifestation of light; a force that moves with the same speed as electricity and light; that is, 186,000 miles per second; but having a different frequency of vibration from any of our known light or electric rays.

The little people spared no effort to entertain me and make my stay agreeable; and on the morning of the third day, it was with no little feeling of regret that I prepared to take my leave.

"You must not think," said the tezarch hospitably, "that you must limit your stay to only a couple of days, because I suggested that length of time in my original invitation. I assure you that we are taking great pleasure in entertaining you."

"I have thoroughly enjoyed my stay," I returned, "but I feel that I am a heavy burden upon you. Since I am so large, I consume your provisions with the greed of a monster; and I know that I discommode you grievously when it comes to sleeping quarters, because I require as much bed room as three or four of your people. But aside from these considerations, I should be getting back; because my people will be worried at my long absence."

"Well," said the tezarch, "now that you know where we live, we hope that you will come again. And when we return to Eros, which will be in the latter part of October of next year, we would be only too happy to have you accompany us. This would necessitate a stay of some eight years on our planet; and would give you an opportunity to become thoroughly acquainted with our little world. I am sure you would find an abundance of things to interest you. I feel that we could guarantee your safe return at the time of another maximum of sunspots."

"This is indeed a wonderful invitation," I said with much feeling; "and it is possible that I may be able to arrange it so that I can go with you."

"I have had the observation tower run up, and we will go out and see what kind of weather is promising for your home trip," said my host.

CHAPTER V

And Witness a Killing

AS we emerged from the living quarters, we found that the water had been removed from the circular caisson and we ascended the little tower near the rim of the circle, and looked out across the peaceful scene.

It was an ideal day, with a light breeze rippling the surface of the sea, and the warm, tropical sun smiling down on the dancing waves. For a few moments we stood in silence, observing the beauty of the scene.

Then a small fish broke water a few rods away, and in a moment a large area of the surface was alive with a leaping school of them.

"What a lot of fishes to be playing together," said my companion in pleased wonderment.

"This is a school of mullet, and they are not playing; they are trying to escape. Some big fish is after them."

And even as I spoke, their leapings and dartings became more furious. Many of them leaped far into the air in their blind haste to get away; and the surface of the water was literally lashed to foam by the frenzy of their flight. They were veritably crazy with fright as they dashed in blind terror in all directions. At first a few rods away, the school rapidly approached us, and the leaping fugitives threw themselves against the circular caisson, or leaping clear of the water, scaled its low brim and fell within the enclosure.

The tezarch called to his associates to come out and gather them up. It was manifestly a new experience to him, and he became quite excited.

"Large schools of mullet often go into such a frenzy when they are being attacked by barracuda, sharks or killer whales," I said. "Perhaps we will get a glimpse of the killers. There, I believe I can see one of them now;" and I pointed to where a long, dark shadowy form shot through the water. It wheeled and darted and dashed here and there, amid the leaping mullet with awe-inspiring agility.

Then to our consternation, it darted straight for our water barrier. Coming on with the speed and force of a projectile, it struck the frail wall squarely head on. So tremendous was the force of the impact that the inflated compartments gave way like a rope of sand; and the great fish was catapulted far out in the drained enclosure, and a cataract of water followed after him.

I stood, dumbfounded with amazement; but the tezarch was galvanized into action.

"Start the air-pumps," he shouted to his subordinates. "We must raise the barrier high enough to bring the whole above the surface of the sea!"

The great fish floundered among the shops and equipment on the ground, creating havoc with the terrific lashings of his huge tail.

I saw at once from the elliptical white spots on each side of the head that it was really a killer whale. This was indeed a calamity to these little people; for such a monster to be floundering around among their buildings and machinery. I felt that the small folk must prove entirely helpless in the presence of such a giant.

"You have better deflate the barrier as quickly as possible, and let in the sea, so the creature can swim away," I advised hurriedly. "He may kill some of your people; and he will surely do great damage to your property."

"This is an excellent opportunity to show you our harpoon gun in action," he replied as he quickly descended the ladder; and in the same breath he shouted to his men to bring the gun.

At once a man brought out a small tubular affair, and two other men followed him bearing what resembled a large storage battery. The tube was quickly set upon a tripod, and connected by wire to the battery.

The tezarch himself aimed the tube at the whale, and fired the harpoon.

There was a muffled report, accompanied by a little cloud of smoke, and the harpoon, a spear-shaped weapon perhaps four feet long, hurtled from the gun and plunged into the side of the whale, trailing after it two light chains.

These chains appeared to be made of light material, but the links were large and wide. I wondered that so large links could be packed in such a small tube.

The whale was lashing about furiously, smashing and upsetting everything within reach.

I wondered what the little people hoped to accomplish with these frail chains attached to the harpoon.

I had not long to wonder, however, for the links quickly commenced to glow with heat, almost instantly becoming incandescent as the heat ran along the chain, lighting up one after the other. One chain assumed a deep violet color; and the other a beautiful red.

For a moment they glowed, standing out in bright relief; and then with sparkling scintillations they disintegrated and disappeared.

The shaft of the harpoon crumpled down, and the end of it melted and dropped in a puddle of molten metal on the rocks. The great animal as if paralyzed by the shock, lay still and stiff with his great flukes raised high in the air, ready to deal another of those terrific blows that had already wrought such destruction to his surroundings.

Good-Bye

WHILE these stirring scenes were taking place, I still stood on the tower. From this point of vantage I had watched the prompt action of my little friends with admiration and wonderment.

They now gathered around the apparently dead whale, with gestures of joy; and unrestrained signs of jubilation. I hurriedly climbed down and joined them. The tezarch came to meet me—his face radiant. "How was that for quick and effective execution?" he asked.

"It was wonderful," I replied. "I congratulate you." "This is something quite different from any-

thing we have on Eros," he continued. "I had not realized that there were such large fish."

"This is not exactly a fish," I said. "This is really an animal, in fact a mammal. He breathes air, much the same as land animals do. You see, he has no gills."

The lively little people now attached a cable to one of the whale's forward flappers, and turned the carcass over on its side. I noted the large, trident-shaped patch on his belly and flanks; also the pointed head and heavy, pointed conical teeth. There could be no doubt that this great black animal was one of the Orca family of whales; a very destructive race that inhabit practically all ocean waters.

I had never before heard of one in Florida waters.

The tezarch returned to me after a little tour of inspection. "Tell me more of these animals, that live in the water and are not fish," he said.

"No, they are not fish," I replied. "They are real mammals, and they suckle their young as land mammals do. The life history of the whale is rather a peculiar story. There is evidence that in the course of their evolution they emerged from the water along with other land animals, who all supposedly had their origin in the sea. After a long period of existence on land, during which time they fully developed the characteristics of land animals, they again took to the water.

"The whale was no doubt a giant among land animals; but he continued to grow after he returned to the sea; and some species of modern whales are now far larger than any other living thing that exists on the earth, or that ever has existed, even in prehistoric times. Whales still possess vestigial arms and legs.

"The front fins are evidently developed from front legs or arms. They contain in a rudimentary form all the bones and joints, and many of the muscles and nerves of a human arm and hand. And if you were to dissect the great body, you would find the rudimentary bones and nerves and even blood vessels of the vestigial hind legs."

"I think we will dissect this animal, and investigate his interior," said the tezarch with sudden decision. "But first we must arrange for your departure. We must not let our bit of good fortune interfere with your plans." He gave orders to have the huge carcass anchored, so that it could not drift away; after which the water was let in to float my boat. Soon I was once more in my own craft, and ready to sail away.

I had taken leave of all the little people except the tezarch. He had accompanied me to the boat, and very cordially renewed his invitation to make other visits to the colony; and he professed a profound hope that I would find it possible to accompany them on their return to Eros the following year. I thanked him very heartily for the royal entertainment that I had enjoyed; and wishing him and his expedition every good fortune, I reluctantly bade him good-bye.

He stepped over the side into the water, and disappeared from sight. I started my engine and headed in the direction of the Florida keys.

When I was fairly under way, I looked back and saw some one floating on the surface of the sea. A small arm and hand was lifted in a farewell salute.

Was it farewell? Would I see these extraordinary little people again? And would I ever make the almost fabulous voyage with them to their far-off home? *Quien sabe?*

THE END

What is Your Knowledge of Science?

Test Yourself by This Questionnaire

1. What would be the practical application of a machine capable of X-raying the earth? (Page 396).
2. What type of life is best fitted to survive beneath the earth's surface? (Page 399).
3. What is the first necessity of medical science in the prolongation of life? (Page 404).
4. Why is it more healthful to live at a high altitude? (Page 404).
5. What are Magnetic Termitaries? (Page 411).
6. What relation do individual termites hold to the Central Intelligence? (Page 415).
7. How are the various types of termites developed. (Page 415).
8. What part does the sub-conscious mind play in man's evolution? (Page 428).
9. What are asteroids? Which is the nearest to earth? (Page 441).
10. By what process are we made conscious of the external world? (Page 450).

In Two Worlds

by Edward E. Chappelow

The black bands were forming the mass into orange balls, hundreds of them that seemed to fill all the intervening space . . . . a world of restless, glowing balls, that seemed to increase in vividness as the background grew darker.

IN TWO WORLDS

IT was on a Saturday afternoon as Ted Nelson and I were coming home from work, that I first learned of his preparations for a new radio experiment. As soon as he mentioned the subject I knew that I was in for some more excitement. Although Ted in working his different experiments would build his apparatus in secret, yet he always had me on hand when he tried them out. The last stunt he tried was to attempt to detect celestial signals in light waves, and although we got no response from space during our untiring experiments, still the tests as he had them planned were interesting, and whenever Ted explained his ideas they seemed quite plausible.

EDWARD E. CHAVELLIER

"Tom, I have been planning an experiment for over a year," he told me as we walked down our street. His house was just a block from mine. "Now I am ready to try it out. But I don't know just what's going to happen when I do; that's why I'd like to have someone with me. Of course you know darn well that I'd pick on no one else while you were around. Still I won't expect you to take part in the experiment, because it's apt to be risky, and there's no use both of us taking the chance at first. But I want you to come over tonight anyway, and give my outfit an eyeful. I've got it set up in the garage behind the house."

"Sure, I'll be over," I replied. "And there'll be time enough to decide whether I'll help you out or not when I see your outfit. And anyhow you haven't explained the nature of your experiment yet."

"Well it's a device for enabling us to see into another world. A world that's within our own."

I looked at Ted in amused surprise and was about to make a joking reply, but seeing the seriousness of his face and knowing how sensitive he was, I remained quiet.

"I planned it out after a great deal of work," he continued, "I had to get a tube that would produce a special type of high frequency wave, and have had them built to my specifications. In fact I've sunk about all my spare money into it during the last year."

"Well I'll be over at the garage at seven tonight," I promised him as we parted at my door, "And if your new waves can show me any new worlds, I'll be right there to get an eyeful."

The garage was built for two cars, but the Nelsons kept only their own car there, and Ted used the spare side for an experimental work shop. Here he usually had a bunch of chemicals, testing tubes, all manner of electrical and radio equipment and whatever else he decided could be used in his experiments. But on this night, the 19th of April to be exact, I was pleasantly surprised as I swung the door open and switched on the light. He must have given his work bench a thorough house cleaning for the usual litter of material was missing, and the only apparatus on the bench was two neat but queer looking radio cabinets. Ted had not arrived as yet, so I walked to the bench to look over the devices. I had no doubt but what they were the experimental apparatus, and I tried to puzzle out how he intended to use the cabinets in his attempts to see into other worlds.

His outfit consisted of one low long cabinet and a smaller but higher one, connected together end to end by six copper jumper bars that were set in spring clips, making it easy to remove them. The smaller cabinet had three rotary switches, each bearing on small copper contacts. The center one had a complete circle of contacts, while the other two switches were bearing on contacts that formed half circles. The main cabinet had in the center of the panel, a calibrated bakelite dial, similar to the tuning dials used on the old type radio sets. To the right of this was a clock, its face flush with the panel, and on the other side of the dial was a milliammeter. Below these and evenly spaced between them, were two switches of the tumbler type. Along the upper part of the panel, above the controlling devices, were five tubes, their tips projecting horizontally from the panel for about half an inch. The two outer ones I recognized as Wilkin amplifiers, but the three located in the center were new to me. They were undoubtedly the special tubes. A wire from a storage battery under the bench was connected to the lower left corner of this cabinet, and two jack holes in the opposite corner indicated that some sort of receiving device plugged into the apparatus.

"That's the outfit," Ted smiled coming into the room, "What do you think of it?"

"Where's your loud speaker?" I asked, motioning to the jacks.

"You'd be surprised. But I'll end your curiosity by showing you." Reaching under the

HERE is one of the most original and imaginative tales that it has been our good fortune to read. We know what your verdict will be when you have finished reading it. It is one of those stories that grows upon you as time goes on.

The science which our author develops, while it is daring and will strike you as sound, is not at all unreasonable. Neither are his adventures with the atomic world. The scientific arguments which he presents are so plausible, that somehow you must say "Why, of course! That's perfectly right!"

We also get a most excellent insight into the mysteries of the inter-atomic world. The story cannot fail to hold your interest, arouse your curiosity and at the same time give you a world of information.

bench he pulled out what appeared to be skull caps with cords and plugs attached. With a mischievous smile he handed one to me.

The cap was shaped to fit the head, and between the cloth and the lining was a great deal of padding. Noticing that the cord ran up into the cap, I felt around among the padding and detected small wires all through it. A pair of straps hung from opposite sides and were designed to buckle together. This I judged was a sort of chin strap to hold the cap on one's head.

"Now I know what you are up to," I said, forming my own idea of what he was intending to do with the outfit. "Our idea is to enable one to hear radio programs without using the phones or loud speaker. In other words you think that you can transfer the electrical pulsations to the brain without first changing them to sound waves."

"That's a good guess, Tom, but you are away off. When I built this outfit I based it on the idea that you have just mentioned, that of transferring electrical pulsations direct to the brain, but not for the purpose you mentioned. I am expecting to control the mind with these electrical pulsations, and in so doing enable a man to see things that are invisible to him under ordinary conditions. In short, just as I told you this afternoon, I expect to break down the barrier that separates us from other worlds that I believe are around us, but which are in planes beyond the detecting power of our senses."

"Well if you are going to try putting magnetic fields through your head you'd better try it on some animal first," I warned him, "Why man, the thing might upset your reasoning powers or paralyze some vital organ."

An Explanation

"FIRST of all I will try to give you a clear explanation of how I expect to accomplish this," Tom continued, paying little attention to my remark, "It is my belief that the human brain operates and performs its work by means of faint electrical impulses, connecting it with the many different nerves of the body. For example, how does the eye pass its message to the brain, or the brain transmit messages to other parts of the body? When you are moving or working in any way, no matter how fast, every movement of the body is controlled by the brain. Now how does it convey these orders simultaneously to different parts of the body, telling you in a fraction of a second which finger to move, which eye to shut? Simply by means of faint electrical impulses sent out by the brain to the many parts of the nervous system.

"The eye-sight is controlled by certain beams reaching to the brain, and these faint beams are effected by the light waves that strike the eye. Impulses of a certain character set up in the feeble beam cause the brain cells to operate. It is well known that there are things that exist that the eye cannot see or else does not see in its true state, because the frequency of the light waves, that these things radiate, is beyond the range of those that the brain works best at and responds to. Also there is a limit to the frequency of the sound waves that the ear will detect, or in my own words, there is a limit to the frequency of sound waves that will operate the brain, to tell it that the ear that has received the sound waves. For any wave above or below a certain band of frequencies, we are unable to catch, and only those within the audible range are able to alter or modulate the faint beams or feelers connecting the ear with the mind, telling us that we have heard. If it was not for this mysterious connection between the ear and the brain we would hear nothing, although the loudest of roars reached our ears. One must reason to know that he has heard the sound, and the reasoning is done by the brain. Now the point that I am coming to is this: If we were able to make the brain respond to a different band of frequencies, then mentally we would be in a different world, although bodily we would still be in our own. In other words we would be in two worlds at the same time, for our brain, elevated or lowered to another plane from that of our own world, would be in a different world from that we exist in normally."

"By jove, it sounds interesting and reasonable enough," I commented as he paused for a moment. "But still I have my doubts as to whether it will turn out as well as it sounds."

"The eye is not in reality the thing that we see with," he continued. "It merely detects the vision, which produces impulses in the feeler beam operating the proper cells of the brain. It is really the brain that sees the vision, because without the brain to tell you what the eye was seeing, you would see nothing. The same applies to feelings. Anything touching the body causes an impulse to be sent to the brain in the same mysterious way, and the brain sends back to the nerves in the neighborhood of the disturbance, orders what to do. For instance, if you get stung by a hornet, you jump on the second, but not before an impulse has reasoned out the fact, and sent orders to the different nerves, the feet to jump from the sting, the hand to swat at the hornet and a score of other movements that occur simultaneously.

"So you see, Tom, the whole control system of the body must be tuned to a certain range of frequencies, and if we were able to make the brain sensitive to a new range of frequencies we would change the adjustment of all the senses, for the senses, like a radio set, would receive the waves of other frequencies and respond to them. Waves of other frequencies are undoubtedly striking our senses all the time, but we don't realize it because the brain will not function to any wave beyond a certain range. So it is not hard to see that if we get the brain to respond to a band of waves of a higher frequency, then the senses will send to the brain, waves received at these frequencies, and will be dead to the present ones, which will be below the

range at which the brain will be operating. In other words the brain will be dead to our present world but sensitive to the world of the higher plane. The nose will detect new scents, the eye will see new sights, the ear will hear new sounds, the tongue will respond to new taste and the body, dead to all former feeling, will be sensitive to the touch of the new world."

"Then I suppose you have designed this apparatus to produce a magnetic field of the desired frequency in the head coils, and by passing this field through the head you hope to take possession of the brain and make it work at the frequency of your waves."

"Exactly", Ted nodded. "In each cap I have a coil of fine wire which is connected to the cord, which in turn is made to connect to the jacks on the panel."

"You have two head sets. Are you planning on us both trying it out together?"

"If you are willing, yes." Ted looked at me critically. "During the first tests I will have the field current so weak that there is no danger of anything happening to us, and as we repeat the tests we will gradually increase the strength of the field in the cap coils."

"But when we are under the influence of this device, will we be able to regulate it as we wish?"

"No. I expect that when we reach another plane of reasoning, this machine and all matter now visible to our eyes, will be beyond our reasoning powers. This world will be invisible to our eyes and its sounds unheard by our ears."

"Then how are we going to control this outfit, which will be in a different world from us? Do we have to stay in dreamland until your battery runs down?"

"I have three automatic circuit devices on it. In case one fails we have others to rely on. One is a clock timing system which is now set to trip the circuit one minute after it is switched on. The second is a slow acting solenoid which can be timed to operate at different speeds by means of the three rotary switches on the small panel, and the third is a small motor rotating disc which breaks the circuit after any length of time desired. I have tested them all out carefully, and there is no fear of all of them failing."

"Well, then we'll make the first test together," I suggested, "being as you are going to start out with a very weak current. I am about as anxious to see what happens as you are."

"All right then, we'll try a one minute test. The three circuit-breakers are already set for that time, and the set when switched on will gradually increase both the density and frequency of the magnetic field until they become equal to the setting of the dials. Also when the breaker trips the circuit, the same gradual change enables our system to return to their former state without any sudden changes. Now if you will slip your head set on, I'll lock the door to make sure that no one comes in during the tests, and then we'll see what's going to happen. But fasten your chin strap securely, for if your head set should come off while your brain was under the control of the set, the sudden release due to your mask falling off might be fatal to you."

CHAPTER II

The First Adventure

IN a few moments we had seated ourselves with the skull caps securely fastened on by the chin straps, and had the cords plugged into the panel.

"All ready?" Ted asked looking over at me.

"O. K.," I replied, "here's for good luck."

Reaching one of the tumbler switches on the large panel, Ted switched it on, and the three centre tubes lit up immediately, while the other two became faintly illuminated. As I watched them I felt a dizziness coming over me. The objects in the room were beginning to look blurred, and I noticed that the two outer radio tubes were burning brighter. I shut my eyes for a moment to ward off the dizzy spell but it was of no use. My head was reeling, and I gripped the arms of the chair to steady myself. When I opened my eyes again, the scene before me was bathed in a whiteness which seemed to fill the very air. Whiter and denser the color became, hiding the room and all its objects from view, until nothing but empty whiteness filled the space about me. My head however was now quite clear, and I was in command of my senses again. I looked over at Ted, but saw nothing only the milky whiteness. My chair and my own body were lost in the enveloping mass. The thick blanket did not hide our world from sight for long however, for in a few moments the objects in the room began breaking through the curtain of white which was losing its density as fast as it had increased. Again that dizziness swept over my brain, but in another moment I found myself sitting in my chair by the radio cabinets and Ted looked over at me with a tickled smile as he unbuckled his chin strap.

"Tom," he exclaimed excitedly, as soon as he had removed his head set, "we've struck it, just as I thought. The high frequency waves elevated our senses to a higher plane."

"You must have seen more than I did then," I answered, "for I saw no sign of your world. The device simply made me dizzy and blurred my vision."

"Sure that's all it did to me, but that's enough. It is enough to show that our senses were thrown out of normal by the high frequency field. I didn't mean that we would see an actual planet, when I talked of another world, although it is possible. I meant that we would be elevated above the plane of our own world into the unknown planes above it. What we will see as we pass into or through

the different planes, I don't know, but our next test should enlighten us. I will increase the frequency about twenty per cent and also increase the density of the field slightly. The most important result of the last test is that we came out of it unaffected by our experience."

In five minutes we were again under the power of Ted's multi-world device, and again I passed through the same dizzy period followed by the engulfing whiteness. But this time the white continued to increase in brightness until it became a dazzling silver which in spite of its brightness for some unknown reason did not blind the eyes in the least. This gorgeous hue had just about reached the most brilliant point possible when a tinge of gold became noticeable, and gradually increased until all space around me was a formless golden mass. Deeper and deeper in color the blanket grew until orange was the dominating hue, and hardly had the rich orange drowned out the brighter shades than I noticed a disturbance in the glowing mass.

A vibrant movement of some sort was disturbing the colorful substance that filled all space. Gradually it increased and dark circular bands began to take form. But, as the change continued, I saw that the black bands were forming the mass into orange balls; hundreds of them that seemed to fill up the entire surrounding space. Disk on disk of glowing orange color wove in among one another and extended as far as the eye could see. A world of restless glowing balls or disks, some large some small, that seemed to increase in vividness as the black background grew darker. It left before my eyes the marvelous sight of countless bright dots and circles standing out against the pitch black background like the stars of the milky way, and as numerous. As far as the eye could penetrate, the space around was a mass of glowing circles.

Gradually the closer ones grew larger and the background lost its brightness and faded away. Closer and closer the nearest ones drew up as they thinned out from the maze, and I was soon able to see that there were in reality many bands of alternate dark and bright stars in each orange disk, one within another, with the centre and smallest circle appearing to be a solid disk. On and on they came as the closer ones gained in size drowning all others from view, and crowding one after another from view until only six of the original circular masses could be seen. These now showed their inner rings quite plainly and I saw that they had from six to twenty fiery circles each, enclosing the six rich orange centres.

Slowly the color darkened, but the changing of position ceased and the scene in general seemed to take on a permanence. The disturbance that I had noticed in the bands had gradually increased however, and the agitating movements of the rings of all the units could now be made out quite well. The next change that I noticed was the brightening of the rings, and with the change the disturbance began to grow fainter. In another moment the group of rings began to draw away as others crowded into view, and soon I was again looking at the maze of countless rings before me, around me, everywhere. Not an object to be seen but the countless bright rings and the jet black background. With the same speed the scenes swept back into one another until once more my eyes beheld the objects of the garage, and once more with a great relief I saw my own body after being thrown into space with nothing but a reasoning mind.

Deeper and Deeper

TED was on me talking with great excitement before I even realized that our second test was over.

"Tom," he exclaimed excitedly, "what did you see?"

"A number of bright circles, one within another is all I saw."

"Then I'm right, Tom, for I saw the same. Tom we've hit upon something that I never expected. Something that will startle the world. We've actually seen the atom in action."

"What?"

"I mean it Tom. Those blurred circles were electrons speeding around their nucleus. We are going to see those electrons in plain view next time we go under."

"You mean that you are going to try and slow down the electrons as they race around their circles?"

"No, not exactly that, but the result will be the same. I am going to simply speed up our senses, and cut down the ratio of speed between them and the atom. Don't you see?" he continued excitedly as I made no reply, "what we've already done? We've increased the frequency at which our senses could work until we could see the orbits of the electrons themselves. The blurred circles were produced by the electrons speeding around their paths at extremely high speed. The electrons are undoubtedly bright objects producing the light all around their orbits due to their speed as seen by us. Our senses were operating at a speed still far below that of the electron, and all we saw was the effects caused by the bright objects as they sped around their centre nucleus."

"Then if you think that we are catching up with the atoms' speed," I replied, "how do you explain the changing of the scenes that we saw? What caused the atoms with their bright rings to draw up closer to one's view until only a half dozen were to be seen?"

"Why the effects of the increasing field current through your head of course. As the power of the waves increase, the sensitiveness of your senses increase, and the range of your eye enables you to see the atoms as being close up instead of being millions of miles away."

"Millions of miles away?" I repeated, "why man, you don't have to look millions of miles to find an

atom. All matter of our own earth is supposed to be constructed of atoms."

"Exactly, "Ted answered quickly, "but when we were looking at the atoms we were not in our own world. We were in a world altogether different. To us now, an atom is too small an object to grasp in one's mind. A milllion of them can find parking space on the point of a pin. Our own bodies are made up of countless millions of them, but when we were under the influence of the high frequency waves we were each of us millions of miles away from the closest atom, just as our solar system is millions of miles away from the closest sun. In reality the atoms are spread out like the stars of the universe, each millions of miles from another. The increase of frequency of the waves in our head caps did not draw us closer to the atoms, but made it possible for our senses to respond to speeds that were closer to that of the atom. That is how we witnessed the change of color as we swept up the scale of frequencies.

"But when the density control regulator of the set constantly increased the strength of the waves, our senses became more powerful or rather more sensitive to the world that they were in. The power of the eye was increased until it could see at close range, a group of the closest atomic systems. One thing that I do not understand clearly is why the micro-universes made their presence known to us in rings instead of as small motionless stars gradually coming closer to us, until the stars and their planets could be made out clearly, just as a man on the earth here would see the distant stars approach us, if such were possible. But it was due, no doubt, to the great contrast between the distance and the speed of the world that we were in.

"Here on earth we can scarcely see the next closest sun, but its motion as seen by us is practically at a stand still although in reality it is speeding through space at a great speed. Now while we were in the new world, we could see the rings of the closest stars or solar systems, as quick as the central bodies or suns. That is because the speed of our senses was not adjusted properly to the range of the eye which was controlled by the density of the magnetic field. In short the frequency and the density of the waves that passed through our heads, were not adjusted to give us the same results that we experience here in our own world."

"You're getting a bit ahead of me," I interrupted Ted's rain of words. "Let me grasp your meaning."

CHAPTER III

A Tragedy

"IT'S just like this," he continued, "suppose that the speed of our universe was speeded up far beyond our present speed, that is in respect to our idea of speed, while our sense of distance remained the same. The planets revolving around their orbits at many times a second would produce bright rings around the paths of their orbits, and an astronomer would see from this earth with the aid of a powerful glass, the universe just as we saw the atomic world, namely, scores of bright rings surrounding luminous disks. But if we were able to draw the distant suns up closer to us by increasing the range of the eye in some way and then were able to make the senses respond to a higher frequency of light waves, we would see the planets slow up in their orbits until the luminous rings disappeared altogether leaving a group of slow moving planets before your eyes."

"Then we would see a bunch of molten hot planets," I cut in.

"Not necessarily. Take for instance a fly wheel on a machine of some kind. Now place a string of lights around the rim of this wheel and start it revolving at, say, a thousand revolutions a minute. At that speed, instead of the individual lights around the wheel, you would see a continuous streak of light around the rim. Now suppose that you were able to speed up your sense of vision, in other words able to grasp speeds in your mind that at present just cause a blur before your eyes. Then you would be able to cut down the ratio of speed between the revolving fly wheel and the range at which your senses can operate, and you would see the fly wheel revolving much slower than it was. Make your senses respond to a still higher frequency of light waves and you would see the wheel at almost a standstill yet it would still be going at a speed of a thousand revolutions a minute to a man of our own world. You must remember that when we saw the bright rings of the atoms we were in an entirely different plane than the one that we would be in when we would see slow revolving planets. What we saw in one plane is far different from what we would see in another. It is a different state of affairs altogether."

"By jove it's too deep for me," I admitted, "by the way you talk, you must believe that every atom is a sort of solar system with the electrons revolving around a sort of sun."

"Absolutely. Why shouldn't I believe it after what I just saw? I don't see how you can doubt it yourself. It not only looks as if every atom is a sort of solar system of another world or universe, but that the planets and even the suns are inhabited with living inhabitants and reasoning beings."

"Aw rot," I exclaimed in disgust, "you mean to tell me that a pin point contains millions of inhabited planets with countless trillions of inhabitants? A mere point of a pin?"

"Correct," he smiled. "There are a million planets with trillions of thinking inhabitants roosting on the point of your pin. Listen-Tom," he became serious again, "science is still uncertain as to the make-up of the atom, some believe still that it resembles the solar system in its make-up, and you know that the atom is known to be infinitely small, so small that millions of them could park on the point of a pin, as you say. Now, all that I am claiming outside of what is already known or believed

concerning the atom, is that you can see it: electrons, nucleus and all. Possibly you see it as you would a solar system with electrons revolving around it like planets of our solar system. However we can't make any more tests until I add another special tube to the set, for we used almost the maximum output of the set the last time. Anyway we've both got to work tomorrow so we'd better get some sleep. I'll have the extra tube added on by seven tomorrow night, and we'll take another trip into the atomic world."

I noticed that something was starting to worry Ted a little, and thinking that he would want to be left to his own thoughts after such an experience, I bade him good night and promising to be on hand the following night at seven, I left for home. I had little doubt but that Ted would sit there and study over the subject of atoms until he fell asleep. But it would have been useless to try to get him to go to bed. I had tried that before under similar conditions with no success. I knew Ted and I knew his habits, and was sure that in the morning I would find him sleeping in his chair in the garage. So making up my mind to get up a little early and slip over and wake him before breakfast, I crept into bed.

My sleep that night was a continuous nightmare of bright rings, atoms, stars and such, topped with a dream of being lost in pitch black space with dark devilish forms and shadows pressing in on me on all sides. Suddenly one of them seized me by the shoulder, and I woke from the dream shaking with fright, to find the light of my room turned on and mother shaking me by the shoulder.

"Tommy, get up. Something terrible has happened. Ted is dead."

"What!" I gasped, suddenly wide awake, "Ted is dead?"

"He was burned to death in his garage early this morning."

Waiting to hear no more, I jumped into my clothes and leaping down the stairs was soon racing down the alley. It was still dark, being no more than four o'clock, and the clear sky above was spotted with millions of stars, that brought back to my mind Ted's lecture on the atomic universe the previous evening, just a few hours ago.

Searching for the Secret

I SMELLED the smouldering ruins of the garage before I came upon the scene, which only tended to speed me up to a faster run. I could not realize that Ted was dead, and couldn't believe that I had seen my pal for the last time, until I entered the alley behind his house and saw the crowd around the still smouldering ruins. In another moment I had broken through the circle of people and stood looking at the scene before me in a dazed manner. The family car was one mass of ruined and twisted metal while the radio cabinets were broken and charred, with their wiring strung all over the area, burned and discolored beyond recognition. With a shudder I turned from the scene and hurried into the house, and there I found Ted, lying on his own bed still and lifeless. The same Ted with the exception that his face carried the most terrified expression that I ever saw on a human countenance. A police officer standing beside me noticed my gaze riveted on that agonized expression of my dead pal and said:

"Must be a terrible experience to be trapped in a fire like that. His face shows the hell that he must have passed through."

"How did it happen?" I managed to ask, at the same time deciding to say nothing about the experiments until I learned more about the situation.

"No one knows exactly," the officer replied, "but it is likely that he fell asleep, and a cigarette fell from his fingers and started some oil or gasoline burning. He was probably half unconscious when he awoke, and in his dazed condition couldn't collect his senses enough to escape, which shouldn't be hard in a garage. When he was carried out by neighbors, he was a raving maniac, with his mind completely gone. He died a few minutes later."

To say that I was overcome by the tragedy is putting it mildly, and feeling the thing getting the best of me, I went toward the ruined garage again. I could not help wondering if the cause of the fire and Ted's death were the result of his having fallen asleep and a cigarette having set the garage on fire; or whether he had continued his experiments with the high frequency waves which in some way caused his death. The words of the police officer that Ted's mind was completely gone when carried from the garage, coupled with the terrorized expression of his face caused me to believe that in some way the latter was the cause of his death, and I determined to try my utmost to find out.

As my eyes roamed over the ruins before me, my attention was attracted by one of the head caps that lay partly burned among the twisted wiring of the experimental apparatus. The outer cloth was burned and torn, and the coils inside lay partly exposed to view. As my eyes followed the cord that led from the cap, I gasped in astonishment. The plug that was attached to the cord was inserted in one of the jacks that was still fastened to a piece of broken panel. I remembered clearly Ted pulling out both plugs from the panel when we finished our last experiment the previous evening. And my discovery could mean only one thing. Ted had used the head set and the apparatus after I left him.

Rapidly question after question rose in my mind. Had Ted carried on the experiments after I left him? Had some unseen calamity happened during the tests that had killed him? Should I tell all I know about the affair and let the authorities clear it up? A chill came over me as I thought of these things, a feeling that was greatly increased when I glanced at the skull cap a second time and noticed that the chin straps were buckled together and one was torn from its side of the cap. I vividly imag-

ined Ted tearing the cap madly from his head, driven insane somehow during the experiment. The determination to find out for myself grew within me, and I began to search the ruins for more clues that would tell me what happened in that garage after I had left him.

My first thought was for Ted's secret box. This was a metal box where he kept his plans, drawings and in fact all paper work of his experiments. He always kept it locked with a combination lock, of which he and I alone knew the combination. In fact no one else knew he had the box at all, for he always kept it back in the darkest corner under the work bench. I soon located the box a few feet away from the ruins. It was none the worse from the fire, and I picked it up, and making sure that no one had paid any attention to me, I hurried down the alley to my home. Entering the house I went directly to my bedroom and locked the door.

Opening the combination lock and raising the cover, my eyes fell on a long envelope addressed to me in Ted's handwriting, and with quivering fingers I tore open the letter and read:

"Tom old pal, I am writing this to you for two reasons. First, you are the only one that knows the nature of the experiments that I am trying out, and second, because I can trust you with a secret and rest assured that it will remain a secret.

"Only in case of serious accident or death to me, will you find this letter, because if I am alive and well in the morning I will destroy it, and you may never know that I wrote it.

"Ted, I am cheating on you, for after you left me tonight in the garage, I continued with the experiments, having made up my mind to go through with the rest of the work alone. But I did it only because I realize the danger and possible fatal results from further tests. After you left I added a spare output tube to the set, increasing the power a great deal, and also adjusted the set so as to produce a current of higher frequency. Having done this I left a note in the metal box here addressed to you, telling you of what I had done and of what I intend to do, so that in case something did happen while I was under the influence of the set, you would know what had taken place. I then set the circuit-breaking device for thirty minutes, and with a slight increase of the frequency control, sufficient to allow me to see the electrons at almost a stop, I increased the output about five per cent and put on my mask for a lone trip into the atomic universe.

CHAPTER IV

Into the Atom

"I WAS about to switch on the set, when I began to wonder what atoms I would see after the waves had taken control of my brain. Would I see atoms of air that were passing before my eyes? Or those of some other object, say for instance, those of the panel of the cabinets that I would be looking directly at while in the land of the unknown? I then decided that the atoms of a solid would probably move with a slower speed than those of a liquid or a gas, because they would have less freedom, and the space between individual atoms would be smaller. To test this out, I decided to place a solid object before my eyes. If I was right in my idea that the atoms of a solid are less free to move than in a gas or liquid, then I should be able to explore the atomic universes in a solid with a lower frequency current that I would need to reach the speeds of the faster moving atoms. In other words I would reach a point at which the electrons of a solid would be plainly visible to me, while those of the liquids and gases were still far beyond the range of my senses.

"Acting on this belief, I took a silver half dollar from my pocket, and propped it up on the bench so that it would be plainly visible before my eyes while I sat in my chair unconscious to my own world. Seeing that all was ready I switched on the set and glued my eyes to the fifty cent piece, until I passed into the worlds beyond and was carried through the different changes until again a few groups of bright rings stood out bright and clear against an inky background. But this time the set was adjusted to give a current of higher frequency to the coils in the cap, and also supply a heavier magnetic field than we used before. And so, after reaching the stage that you and I reached in our last tryout together, the scene continued to change and draw closer. The fiery circles of one of those atoms drew closer until it alone was before my eyes, the others appearing to be far off. Also the disturbance of the rings kept increasing, while the bright orange color began to dull and lose its brilliancy. Gradually the disturbance of the rings increased and the bright circles grew duller until one after another they broke, revealing their bright little speeding electrons.

"Slower and slower the speed of the approaching little planets moved and in another moment I was gazing with wonder on thirteen slow revolving planets of different sizes, but all globular in shape. They were all rotating clockwise around the centre disk with the exception of the third and seventh, counting from the centre. They were moving around their orbits in the opposite direction to the others. When I had reached this stage of the experiment everything went blank, and for a moment or two my senses were completely confused. I found out after the experiment that it was due to the field control regulator sticking and then suddenly releasing and increasing the output with a sudden jerk that momentarily paralyzed my senses.

"But when I opened my eyes again and was able to see plainly, I was surprised to see that the scene had advanced so far that I was now only able to see the sixth and seventh planets. They stood out before my eyes now almost motionless, and as large as moons. It was a marvelous view.

"I would have been content to have had them remain as they were for the time being, in order to study the alternate bright and shaded strips and

patches that now could be seen plainly on the surface of each. But the output regulator of my set had not yet reached its limit and the two shining globes drew up closer and closer, while the rest of the planets of the family became smaller, becoming in size and appearance as the thousands of distant suns that studded the background beyond the two approaching planets.

"On and on they came, and gradually the sixth became the centre of interest, as the other was gradually being crowded into background and appeared to have stopped approaching. In fact, in view of the other now magnificent globe it appeared to be growing smaller and more distant. With wondering eyes I gazed at the one huge glittering planet that was now before my eyes, its markings now quite visible as it shone there against the eternal blackness of the surrounding space. My first speculation was that the bright sections of the monster would prove to be clouds, but as I got a closer view of the oncoming world I found out that I was mistaken. No clouds were visible, and the light and dark patches both proved to be land, but land of two different appearances.

"That there was an atmosphere surrounding the globe I soon discovered, for only when the globe was close could I make out the surface clearly. I saw no large bodies of water but made out a great number of enclosed lakes. The surface was thickly spotted with holes of different sizes containing water. As I looked over the surface my attention was attracted to a dark spot on one of the light areas of land, and I was soon able to recognize it as a collection of buildings of some sort. A possible city.

"Again my senses reeled and everything went dark, with the exception of bright flashes that shot across the blackness before my eyes. The field current regulator had slipped again, allowing the current to increase in the head coils with a rush. Again my senses cleared and my brain became attuned to the world that I was in, and again I saw scenes before me.

The Girl in the Atom

"BUT the vision that now met my eyes was the most astonishing of them all, for I found myself at the base of a huge towering round shaped castle constructed of a smooth black substance, that showed not a line or a break over its entire surface, except doorways. There were plenty of them scattered at regular intervals over the surface of the structure. An arch was formed over each door and an inverted arch at the base of the doorways or openings. Although some of these doorways were at least a hundred feet above the ground, no steps led from them and no protecting railings surrounded them. They were just so many openings in the smooth unbroken, glossy, jet-black surface.

"I had scarcely time to notice these things before I had come so close that I could see only the base of the huge structure. But my eyes soon beheld other things of interest. I was now in a garden at the base of the castle. There were no flowers visible, no cosy seats to sit on and while away the hours, no paths of cement or gravel, but a smooth unbroken carpet of soft velvety grass, far softer and richer than any I had ever seen before. Scattered over the entire area were trees of a uniform height and shape, their thickly covered branches starting at about five feet from the ground and ending in a point about twenty feet above. In the centre of this enclosed haven of rest was a clear pool of water, its bottom covered with the same soft short grass that grew around it.

"It was while I drank in the peacefulness and beauty of the scene before me that I saw a vision that I will never forget. From behind one of the trees a girl stepped into view. A girl whose form was, with the exception of a few minor differences, an exact model of those of our own world. One of the things that I first noticed was that she was armless, a discovery that, had I been able to think and reason in my own natural way, would have caused me to feel sorry for her. The fact that her loose flowing dress had no sleeves or openings for arms was enough to convince me later, that her entire race was undoubtedly armless, and that they must have other means of accomplishing their work.

"Her face as I saw it from a short distance was a perfect picture of beauty. The small nose, firm dainty chin and the rich mass of brown wavy hair that hung down over her shoulders produced an effect upon me that I will never forget. The scene ceased moving as my field regulator had reached its maximum point, and I remained a distance of a few yards from this heavenly vision unable to approach closer. I tried in vain to draw near to her but some power held me back. I tried to call to her but failed to make any sound.

"A craving to be close to her possessed me and unable to realize that I could in no way make myself known to her, I tried every possible way to attract her attention. But to her I was invisible. She stood beneath the trees looking directly towards me with those soul devouring eyes but not a sign of recognition to be seen on her face.

"Once more the world around me began to move and change, and the garden began to draw away from me as though I were being carried swiftly up into the air and away. Sadly I watched the pale white angel and her garden fade into the distance until again it was but a dark spot on the surface of the planet, a cluster of jet black castles of an atomic city. And soon the girl, garden, castle and city were lost in the maze of bright rings that filled all space before my eyes. A few moments and I was back in my own world. Back to the point from which I had started; my garage.

"As I removed the head piece a feeling of utter loneliness came over me. In some way or other I had a clear recollection of what I had seen, and could picture the scenes with ease. I could with

little trouble picture the face that I had seen in the atomic garden. But, as the events rose in my mind, the wretched feeling of loneliness completely mastered me. From the moment that I removed my head set, the name Celina was firmly stamped in my mind, whether in some mysterious way I had really learned her name while on the atomic planet, or whether in some freakish manner, I invented this most beautiful of names.

"Anyway the name Celina had firmly stamped itself in my memory and when I think of the beauty in the garden I think of Celina. It was useless to try and overcome the wretched feeling of loneliness. I wanted to go back, back to that atomic world, back to Celina, that girl of girls, to stay there forever in that garden of love. The thought that her home and her world were but a part of an atom in our world was hard to realize. In fact I didn't want to realize it. It was madness to think that I could never enter her world or bring her into mine.

"Suddenly it came to my confused senses that the atom which was her solar system was, to my senses, one in millions and millions that were crowded infinitely close together, and with this came a terrifying thought. Would I see the same atom again the next time? Could I possibly single the one out from its millions of brothers? My blood chilled as I realized the impossibility of such a thing. She was lost to me forever. Never again would I see that garden, or Celina, the girl that I had learned to love with a fierceness that was beyond control. With this realization of my love came the growing desire to return to her. The longing in my heart ate deeper and deeper, until in desperation I began to prepare the set for another trip into the unknown.

"I adjusted the field regulator, further increasing the output, in order to draw the scenes closer to me, unmindful of the danger of passing heavier fields through the brain. I thought only of her, Celina. Coming closer to her would allow me to look into those eyes, to see those tempting lips close to mine, and feast my eyes on the rich masses of dark brown hair.

"Tom, I am fighting against this feeling with all my might, but there is more than love pulling me. I am sure that the strain of the last test has caused this desire to return. Something strange and unheard of has taken hold of me this way, and has bedded in my brain the desire to go back to her.

"So I am writing this to you, Tom. You alone will understand. I couldn't continue life like this and I know that I will not return to your world. I am in full possession of my senses, but there is a power that I can't explain and can't resist. I must go. I must see her again. And if I do not this time see the same atomic system and the same girl, I hope that I do not come back alive. I would rather go on in spirit to the universe where the inhabitants of all worlds eventually must go. Then I will be sure to see her again.

A Half-Dollar Piece

"IF I come out of it this time, rid myself of this wretched feeling, this mad desire that is gripping me, I will destroy this machine and tear this letter up, and no one will ever know the hell that I am passing through. I have the set adjusted to trip in three hours, that will be five o'clock, allowing me time to destroy this letter before you come in at breakfast time as I know you will. If I fail to come out alive, you alone know that I keep this metal box, and will sooner or later find this letter.

"I have a feeling that I am breaking some universal law in penetrating the veil that separates us from other worlds around us, and that something will happen when I try again. But I would go Tom, if I was certain that I would never come back. Now as a last request, old pal, take good care of the half dollar, for I believe it contains the atom that I have just seen. Remember that somewhere on it, is a little girl that I am trusting to your care. Now I will go, I can't hold back much longer. Forgive me old pal, if my love for her is greater than my loyalty to you. Ted."

My eyes were moist with tears when I finished reading the letter, and my first thought was of the half dollar piece. It was Ted's last request that I take care of it, and without any further delay I hurried back to the grim blackened ruins of the garage, and after a few minutes' search among the tangled wires and controls of the experimental apparatus, I found the silver coin, unharmed and unscarred. Realizing that the slightest scratch would remove millions of atoms from the coin, I wrapped it up carefully in a handkerchief and sadly went home.

The events of the night passed through my mind as I paced the floor of my bedroom, and I bitterly cursed the infernal device that had led my pal to his death. In a blind rage I took the plans of his apparatus from the metal box and tore them into bits. No other man would be lured to his death by a similar apparatus if I could help it. With the set a tangled mass and the plans of the apparatus destroyed I felt that I had done what Ted would have done in my place.

To this day I have guarded carefully the half dollar, protecting to the best of my ability the world and home of Celina, the girl of Ted's dreams. The girl whose charm and beauty had innocently led him to his death. Perhaps Ted was right when he referred to the universe where all would meet some day. Perhaps he will again meet the girl of his desire in a world where all worlds unite, and where no barriers of time and space will separate them.

THE END.

The Metal World

(*Continued from Page 399*)

heat at, say 50,000 degrees centigrade, would doubtlessly, when released, create a beam of such intensity as to destroy almost anything in its path for the duration of its power.

"Perhaps few who beheld the creatures when they appeared on the Surface had the presence of mind to study them thoroughly. Around the body of each were metallic belts, containing a number of concentrated heat cartridges! These, like our gun-cartridges, could be inserted in their ray-pistol chambers and their contents released probably by some form of a trigger.

"You are aware that any form of life living under such environment and conditions as the Demetrians in their Inner World, where atmosphere is totally absent, would not be required to develop the organs for breathing. In other words, they exist like a fish that has been frozen in solid ice, living without the air that we of the Surface require to exist. If the Demetrians were at one time a Surface race, they adapted themselves to the interior gradually and lost their breathing organs as the air enveloped with them was consumed. This change is no more phenomenal than the evolution of man from the lowest form of life existing at the beginning. Then as the world built up its surface crusts they made the best of the situation, and built up the domain we are observing.

"There they have remained until the present, content until they discovered that life existed on the surface probably by observing the ever deepening tools of our drilling penetrations. Then they began to object to our exploitation of what they believe to be their own resources and declared war to force us to cease. Their discovery of the *Cyclops,* doubtless their first Outer World expedition, taught them much about us.

"However, in trying to find a method to force them to our own terms of peace, taking into consideration their apparent immunity to death by violence, I hit upon a scheme for dissolving them with powerful gases embodying the principles of the sixth element which, as you know, is a distillation of sulphuric acid in combination with chemicals of ethereal qualities. As a result I have evolved a gas that will dissolve any organic matter coming in contact with it.

"Each of my twelve boring machines which you see racing downward will discharge their cargoes of dissolving gases within a half hour. Each tank contains twenty-four tons of the distillation or a sufficient amount of the gas to dissolve all humanity were it confined like the Demetrians. The machines are operated automatically and timed to the instant to release the gases which will circulate rapidly through the vistas and tunnels of the Inner World."

Tense, the visiting scientists in the laboratory watched the arrival of the Earth Borers in the domain of the Metal World. I chewed at my nails until blood flowed freely from the tips of my fingers, as the tanks, mere dots on the screen, entered the Metal World. They had bored through hundreds upon hundreds of miles in that short period, to reach the areas calculated to the dot of a needle point by Professor Blackton.

Finally the machines, as though controlled by one single hand, suddenly opened. Out of them poured a heavy, yellow murk that drifted swiftly through the vistas of the Demetrians. Even in the haze I could see the writhing forms of the beasts as the gases floated through thin tunnels and dissolved them into nothingness.

Virtually millions of the huge, centipede-like creatures raced along their thoroughfares to escape the oncoming destruction that now was flickering tongues of yellow into their ranks. With growing swiftness the murky haze of yellow gas penetrated into every open nook of the metal domain and gradually overtook those who sought to escape. Sick and nauseated I turned my head from the screen.

I heard the exultant shouts of the observers in the laboratory as the gases gradually wiped out the seething millions far below us. My brain crying out for me to refrain from looking again at the screen, was overcome by the thought of what might have happened to the Surface World had it not been for the unexpected achievements of Professor Blackton. Surely the Demetrians would have laid our beautiful world to ruin without an instant's hesitation. And here was the result of humanity's great desire for self preservation!

When I was able to look on the screen again, the world far below had become a world deserted. No life was visible anywhere. Somehow I could not suppress a feeling of keen satisfaction that was struggling in me for release, and with a bound I reached Professor Blackton's side and grasped his hand, showering him with congratulations.

The value of Professor Blackton's great X-ray machine is now a matter of history. The world has found it invaluable. The State of California was immediately presented with the original machine by its creator after it had performed its work for the human race. And the future of the Earth Borers is already assured for many have already been built by the Federal Government as a measure for national defense. Like the submarine, the Blackton Tank, as it is now known, has become one of the most powerful implements of warfare that the world has ever known, notwithstanding the Demetrian Rays. I need not explain how Professor Blackton developed the ray, using the same principle handed to us by the destroyed scourge of the Inner World. And it is already known that Professor Blackton was greatly rewarded by each individual state and city in the nation, to say nothing of the gifts of finances made to him by the Federal Government. Those funds, as everyone knows, went for the advancement of science as only the famous gentleman understands it.

THE END

Into the Subconscious

(*Continued from page* 435)

of that age (which has been placed variously at anywhere between 26 and 260 millions of years ago) is incredible and, but for the evidence of our own eyes, tonight, unbelievable. But, nevertheless, what we have seen, has proven to be a fact. It was actually the sub-conscious mind of one of the several species of Pelycosaurs, one of which you saw plainly, consorting with the other on the rock, a species that was about four feet long. The monster that caused them to seek the bottom of the lagoon, was undoubtedly the species with the high fan-like dorsal fin along the back. This dorsal fin was probably six to eight feet high and the body was about nine to ten feet long. When they sank into the ooze at the bottom of the lagoon, I waited a while, hoping that they would rise again, but as they did not, in a short time, I urged the subject back further and then came the uttermost limit—the outer edge as it were.

"You noticed the dim reddish light, rather blurred? No details at all? What that meant is open to conjecture, but, in my opinion, the possessor of the mind, at that stage, was probably one of the earliest forms of life—possibly a *Trilobite* or some such creature, of that period of life, the very dawn of life, you might say, on this planet.

"Seeing the futility of trying to penetrate backward any further, I decided to leave it to the subject, himself, to choose the next phase of his existence. I requested him to show me the life that had made the deepest impression on his sub-conscious mind. It has always been my theory that some one period of a man's life is fuller and more satisfying to him than any other period which he has experienced, that certain time when he is the happiest and most contented; when he really lives; the time he always looks back to as being the best period of his existence. You follow me, do you not? I have tried to make it plain to you.

"Well, to continue, if this be true of a man's life, why shouldn't it be true of his many lives down the ages? Thus, I asked my subject to show me that period and it was the last scene pictured. Evidently, the life that impressed itself on his mind the strongest stamped each succeeding life with the type of features he possessed, during this time. Evidently, this is so, for, as you no doubt noted, the features of the creatures in the last scenes bore a strong resemblance to our subject's features, both in face and form. He also, unwittingly, showed us events leading to his death, as there is no doubt in my mind, that the last picture you saw, was his actual death scene.

"I think we all felt the paralyzing effect of those baleful eyes in that hideous reptilian head and there can be no doubt as to how our subject departed from this earth in that phase of his sub-conscious mind's existence. There is also no doubt in my mind, that, if I hadn't stopped when I did, and released him from the influence of my Ray, he would have followed out the scene, even to actually dying, so strongly was he re-living the scene over again.

"I had to bring his mind back to the present with all possible speed, which, in itself was dangerous. I hope he will show no ill effects from his experience tonight. And, now, gentlemen, although you may not realize it, it is broad daylight outside. Another day has dawned in our present existence, just one more of the many billions of times this old planet has seen dawn, since that far-off age when the sub-conscious minds, of even the three of us here, began the long upward climb to the high plane of existence we are in now. Let us have some breakfast and get a few hours of much needed rest, which I for one, am badly in need of."

Silently he led the way up-stairs to the combination living and dining room where he soon had a hot meal of country bacon and eggs on the table, of which they partook heartily. As they finished, footsteps were heard on the gravel walk and the old gong gave forth its summons. The Doctor opened the door, and there on the step outside, stood Sam! "Good morning, Doc," he croaked and went on, without waiting for the Doctor to answer, "Say Doc, you know, somehow or other, I didn't get over here at all last night. I musta been pretty tired, 'cause I don't remember a thing that I did after I milked old Betsy, last night, 'till I woke up just a little while ago. Then I remembered you wanted me to come over here, last night for something. Was it important? Did you get along all right without me?"

The Doctor smiled. "Yes, Sam, we got along all right. Maybe some other time you can come over and help me out. Here's something for you anyway." And he handed Sam some money.

"All right, Doc, all right and thanks," bubbled Sam. "Glad you didn't need me real bad. Sure, any time I can help you out, you can depend on me, yes sir." He turned and pattered down the path and out the gate.

The Doctor watched him, with a quizzical smile on his face and a shake of his head. "If you only knew, my boy, if you only knew," he muttered, as he turned and went inside. Finding his friends had already sought the bedrooms and had retired, he walked into his office and sank into the chair before the old mahogany desk, sitting deep in its comfortable depths and staring straight ahead into space. And although he appeared to be asleep, anyone having a glimpse of those heavy-browed eyes would have agreed that a keen, active mind was at work under his grizzly, curly hair.

THE END

Science News of the Month

ASTRONOMY—METEOROLOGY

NORTHERN LIGHTS CAUSED BY SUN

Researches conducted by Dr. H. B. Maris and Dr. R. O. Hurlburt of the Naval Research Laboratory indicate that the northern lights are caused by eruption of great quantities of ultra-violet light from the sun, according to *Pathfinder*. The behavior of comets was studied from 1843 to 1927 and it was found that northern lights came at the time of comets and it was assumed they had the same influences working on them. The ultra-violet it is said, strikes the layer of atmosphere or "mirror" 100 miles above the earth and sets up heavy winds which disturb this layer. Radio communication is made impossible and electric cables are paralyzed. These same disturbances produce what are known as northern lights.

COMETS BELONG TO OUR SYSTEM

Comets are not merely wanderers thru space but are members of our own solar system, declares N. T. Bobrovinkoff of the Lick Observatory, University of California. Their age, however, would not make them part of the original solar system which has an existence of 10 billion years, but would seem to indicate that they were captured by the sun as our system moved thru the heavens one million years ago. The sun, he said, is traveling thru space at the rate of 20 kilometers (about 12½ miles) a second. This means that a million years ago our system was 70 light years away from its present position in the direction of Orion. The career of comets, he went on to state, in behalf of his theory, is always the same. They have the same spectrum and seem to have a common origin. Furthermore we do not seem to get any new comets. The fate of comets is inevitably to turn into meteors or in some cases to meteorite.

EARTHQUAKES FOLLOW PERIODIC LAW, SAYS ASTRONOMER

Abbé Th. Moreaux, director of the Observatory at Bourges claims that a theory of earthquakes that he laid down a great many years ago has been verified by the passage of time, according to the New York *Herald-Tribune*. That theory is that earthquakes follow periodic laws and are not simply casual disturbances. They are affected as our climate and atmosphere are by the sun's activity. Sun spots are only one of the forces acting to produce quakes, but there are a great many other of the sun's activities which also operate to cause our subterranean disturbances. He predicted in 1923 that, as far as quakes were concerned, we would pass through a crisis in 1923. He now predicts a slight increase in agitation during 1929 and 1930, with 1931 a little calmer, this period lasting until 1934-35.

UPPER ATMOSPHERE HOT OR COLD?

An experiment recently conducted in France to determine the atmospheric conditions thirty miles up indicates to the scientists concerned that at 30 miles the temperature is that of boiling water, 212 degrees Fahrenheit, according to *Scientific American*. The experiment was the setting off of thirty tons of explosives and the recording of the time when the sounds of it reached distant observers. The observations included the conditions of the winds and temperature, and deductions as to the state of the upper air were made thereby.

Professor Charles Maurain, director of the Institute de Physique du Globe, at Paris, believes that the atmosphere has a uniform temperature to over 30 miles. J. F. Whipple, British meteorologist, concluded that the 30 mile limit shows the air at 212 degrees, thereby disproving the generally accepted idea that at that point the temperature is 71 degrees below zero.

STRANGE ELEMENT FOUND ON SUN

The use of the telescope to tell us something of atomic structure was described by Professor H. E. Shaldon of New York University commenting on recent solar eclipse observations. The blotting out of the sun during an eclipse and the making visible the sun's corona has allowed the spectroscope to analyze the gases present in the corona. Among them has been discovered, in addition to many gases well known on earth, a strange one which is called *coronium*. By a number of studies made during eclipses (each necessarily short because of the brevity of the eclipse) it is hoped to discover just what *coronium* is. Tests so far ally it to the rare gas argon. Some believe it to be quite an ordinary gas, just as *nebulium* which Professor Millikan found to be nothing more than an unusual arrangement of nitrogen and oxygen.

ROCKET TO EXPLORE SPACE'S MYSTERY

Although the test made by Professor R. H. Goddard in Worcester, Mass., in sending a rocket to outer space appeared to have failed (the rocket having burnt), the Smithsonian Institution, which is backing the work, believes that a rocket will be built that will be able to explore outer space. Delicate instruments will be carried in the rocket which will register the data such as atmospheric conditions, temperature, pressure, etc. The Institution does not contemplate a trip to the moon with the rocket, believing that if they can obtain meteorological data in the earth's rarified atmosphere or just beyond it they will be doing enough. Dr. Goddard has been working on the rocket since 1914, and has worked out mathematically the possibility of a rocket going even beyond the earth's gravitational influence.

AVIATION

PLANE TO MAKE TELEVISION BROADCAST

C. Francis Jenkins, noted inventor, will attempt a new form of communication this year when he will broadcast scenes of Washington from a plane through a television set. Experiments which Mr. Jenkins has made have convinced him of the feasibility of his project. The attempt will be made, as he says, before the actinic rays of the sun become too weak at the end of the summer, and the experiment will be for the benefit of televisors amateurs in the east. The scanning eye in the set is fixed in the floor of the cabin of the plane, will pick up the scenes and transmit them through the plane's radio set to the station at Rockville Station, Md., where they will be broadcast on a high power transmitter on a frequency of 1900 kilocycles.

HEADWINDS CAUSE FAILURE OF EAST-WEST OCEAN FLIGHTS

That it has already been definitely proved that the east-west Atlantic non-stop flight is not possible as a regular thing, is the belief of Lauren D. Lyman in the New York *Times*. Headwinds blowing from west to east are a characteristic of the ocean in the northern hemisphere and planes as now constructed cannot successfully battle them. A chart in the office of Dr. James H. Kimball of the Weather Bureau in New York shows definitely the course of winds over the ocean. Only in the South Atlantic between latitudes 30 degrees north and 30 degrees south is the wind from east to west. Below and above that belt it blows steadily to the east. Those flyers, therefore, who have tried the east-west hop, and many of them have died in it, have used up their fuel in battling the terrible winds. The *Graf Zeppelin*, which on its first voyage took 111 hours to make the flight to America, was able to make the return trip in less than half that time. Dr. Kimball himself believes that our planes are not yet ready for the Europe-America flight in the northern hemisphere. Planes able to hold a great reserve of fuel and possessing much more powerful plants than are now in existence must come first.

GIANT GERMAN PLANE TESTED

The great German plane of Dr. Dornier, the DX, has been successfully tested in Germany. Designed to carry a pay load of 11 tons or 22,000 pounds, the craft, which is a sea plane, has a wing spread of 225 feet. It can travel at 150 miles an hour, although its cruising speed is 120 miles per hour. It is powered by twelve motors in tandem. It has a main deck sixty-four feet long. All the motors will be controlled from a single engine room. There will be an engineer with four assistants to operate the motors. The plane can carry 120 passengers. In its test over Lake Constance the plane took off from the water in 30 seconds.

SAFEST IN FRONT LINE DURING FUTURE WAR

That the progress of aviation, especially in the development of bombing planes, will make large cities dangerous places to be in, is the opinion of Major V. Camejo, Military Attaché of the Spanish Embassy, as expressed in *Aeronautics*.

LUFTHANSA TO OPEN REGULAR OCEAN SERVICE

Lufthansa, the great German aviation company, on the completion of successful tests of three great flying boats, will shortly begin a regular ocean air service between Travemuende, Germany, and Pernambuco, Brazil. Due to the loss of a government subsidy, they will not be able to carry passengers as planned (they are not very profitable) but will carry only mail and freight. The route to be taken will be via Lisbon, Canary Islands, Cape Verde, Fernando de Noronha and Pernambuco, where connection will be made with the Condor Syndicate operating through South America. A weekly service will be made each way with the possibility, if successful, of extending the service to the United States. Exhaustive air tests have already been made of the three Romar flying boats and so far they have proved successful. A distance of 2,500 miles was covered in 25 hours, and inasmuch as the greatest hop on the new route is 1,500 miles, the company feels little doubt about the safety of the proposed [illegible].

BIOLOGY—EVOLUTION

HUMAN RACE DOOMED TO DECAY BY NATURE

There is no inevitability about the human race continuing, says Dr. Daniel J. McCarthy in the New York *American*. Nature is conducting a physical experiment with us, and as soon as she is through with us, we will pass on to give way perhaps to another type of animal. Dr. McCarthy draws an analogy between races and men. After the age of fifty, men begin to decay, as they have lost their fertility and so nature has no more use for them. Thus when our white race grows soft and sterile we will give way to the black or yellow. And they in turn will give way to perhaps the white ants (termites). We have not grown in brain power, but merely in our ability to make our brains effective. The average Athenian at the time of Plato had better brains than the average man of today. Nature, anyway, is not interested in our brains but in our bodies. And when they become too weak, we will pass on.

RESTORATION OF "DEAD" NOW POSSIBLE

Commenting on a recent statement that Professor Feodor Andriev, the Russian scientist can revive the dead, Professor H. H. Sheldon, writing in the New York *Herald-Tribune*, doubts whether there is anything particularly wonderful about it. "It all depends," he says, "on what you mean by *dead*." Years ago if one's heart stopped beating for even a few seconds then he was dead and given up as such. But now the injection of *adrenalin* can prevent coagulation of the blood and the heart action can be restored. The cessation of heat beats was not the sole cause of death but only one. Artificial respiration is also bringing back to life many cases that would have been given up in the past. The replacement of worn out parts of the body by mechanical parts may be accomplished but it is not likely to add much to man's happiness. We who are living, it seems, are doomed to death.

DISCOVER CAUSE OF EVOLUTION IN EARTH RAYS

The actual activating cause of evolution [illegible] the mutations in species of living things has [illegible] ways puzzled scientists. Now two University California experimenters, Dr. E. B. Babcock and Dr. J. L. Collins, according to *Science News-Letter*, have located one cause of evolution in rays emanating from the earth. The rays are supposed to have possible radio-active qualities. Two groups of flies were studied. One group was placed where the rays emanated very strongly and another at a place where they were relatively weak. After five months culturing it was found that the flies subject to the rays displayed mutations twice as often as the others. In this mutation the male embryo die before hatching, leaving only the females. This experiment is believed to open a possible method of approach to the question of how evolution occurs.

CHEMISTRY

CHEMISTRY ALLIED WITH BIOLOGY

The sciences of chemistry and biology are closely allied, said Professor George Barger of the University of Cambridge (England) speaking before the British Association for the Advancement of Science and reported in *Science*. The field of chemistry has broadened out from merely a study of inorganic and organic substances to that of living things. Botanists and bacteriologists have the chance of making new discoveries in the proportion that they are versed in chemistry. The sciences meet at the line of organic living things and from this meeting they establish a strong tie.

NITROGEN-DIOXIDE CAUSED CLEVELAND DISASTER

The terrible nitrogen-dioxide formed from the decomposition of the nitro-cellulose X-Ray films caused the death of 124 persons in the Cleveland Clinic, according to the official statement of Dr. William E. Lower, one of the clinic's directors. The inhalation of nitrogen-dioxide is pretty nearly always fatal. At times death occurs at once, and at other times a number of hours elapse before death. As a result of the tragedy a resolution was introduced into Congress to gather information about Washington, D. C. hospitals to determine measures necessary to prevent a recurrence of the disaster.

OCEAN'S SALT COMES FROM VOLCANOES

The discharge of 100 million tons of hydrochloric acid every year from our 485 known volcanoes supplies the chlorine that keeps the ocean salty, says Dr. Thomas A. Jaggar, director of the Hawaiian Volcano Observatory, as expressed in *Science*. The gas comes into the air from the volcano emissions and finds its way into the rain. With the average rainfall of 40 inches a year throughout the world only about one part in five million of chlorine is needed for the ocean's supply. The sodium which unites with the chlorine to form salt is brought into the sea by rivers. The volcanoes in Alaska alone supply one per cent of the chlorine needed. The presence of calcium carbonate in water was also explained as the depositing on the ocean bottom of the remains of billions of tiny organisms called the *globigerina*. The ocean floor is built up a foot a year from these tiny organisms. But they are only found where the ocean is not too deep, for beyond 2½ miles of depth the chalk deposited would be dissolved

THE GERANIUM AS AN INSECTICIDE

Geraniums have recently been used as a means of killing off the Japanese beetle. The insect feeding on the plant becomes paralyzed and falls dead from it. An interesting complication is presented by the studies of Charles Ballon of the Bureau of Entomology, who found that plants exposed to the sun possess a destructive power much greater than those that are shaded. That the sun has powers of destruction as well as curing seems to be paradoxically true in this case. The Bureau is determined, however, to solve the paradox.

"Science News of the Month"

portrays in plain yet concise language every important scientific advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 42 scientific journals as well as a score of other sources are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, etc.

ERGOSTEROL FOUND IN MUMMY

Ergosterol from which the precious Vitamin D is derived has been recently found in the brain of an Egyptian mummy which dates from the year 500 A.D., states *Science News-Letter*. Three research men, Dr. H. King, Otto Rosenheim and T. A. Webster, working for the National Institute of Medical Research in London, made the discovery. The ergosterol was protected in the body by the presence of another substance called cholesterol which was originally supposed to be pro-Vitamin D. When it is separated from the cholesterol it is unstable and usually disintegrates.

CRUCIBLES STAND 1,500 DEGREES

Crucibles for holding molten mixtures of iron sulphates, which produce an extremely high temperature, have been devised, which under test have withstood 1,500 degrees for forty-five minutes without any seepage occurring. The development was made by the Bureau of Mines. The crucibles are made of pure electrically fused magnesium oxide mixed with 3% of alumina, finely ground. The mixed oxides were then moistened with a fixed quantity of magnesium chloride tamped into a three-piece mold, lined with heavy paper as a slug with the outside shape of the crucible. The mold was then hollowed out in a lathe and after drying was heated in a high frequency induction furnace the temperature being worked up gradually to 2,100 degrees.

AUTOMATIC REFRIGERANT FOR FREIGHT CARS

A new and ingenious refrigerant for freight cars which operates automatically to keep the car at a definite temperature is described in the *Erie Railroad Magazine*. The first actual use of it was made by the transporting of a carload of fresh beef across the United States. The basis of the action is the use of a glass-like substance called *silica gel* which possesses a great power of absorption of gases. The action of the refrigerator is as follows: A thermostat is set for the temperature desired. When it rises a device allows the refrigerant gas, sulphur dioxide, to flow into the *silica gel* and thus reduces the pressure and temperature of the gas. The gas flows thru long tubes which extend the length of the car thus cooling it. When the temperature is lowered sufficiently the flow of gas is shut off by a timing device and a bunsen flame is put on under the *silica gel* which causes it to expel the gases. The gas is then passed through a condenser where it is liquefied and returned to the evaporater. A timing device allows the flame to burn for thirty minutes at a time and the gases are heated for that period producing refrigerant to keep the car cool for nearly five hours.

MEDICINE

SERUMS GROW IN FOREIGN BODIES

In order to determine whether an animal's blood could grow in a body of a different species Professor H. W. Mosswring of Stafford University injected horse blood serum into rabbits. He wanted to determine whether this serum could exist apart from the body that fed and nourished it. After a few days had passed the rabbit's blood was examined and from two to four times the amount of serum injected was found to exist thereby indicating that it did grow apart from the horse. The results of this experiment are quite startling although its implications and possible use have not been indicated.

FATTY ACID MAY CAUSE TUBERCULOSIS

Research workers of the Rockefeller Institute have discovered a "fatty" acid which may the cause of tuberculosis. The acid which a solid at certain temperatures induces the ath of tuberculosis when injected into other- se normal animals. A study of its formation human cells and its activity is now in progr s in conjunction with the National Tubercu- s Association to determine the chemistry of action, and that of the bacillus which acts a parasite of the cells of the body. The ercule cells are being made in large quantit- s and the studies in connection with them e being divided among various scientists. The tty acid is of such power, it is declared, that ose injected into the tissues of a rabbit easily reduce reactions similar to tuberculosis. It lso has the power of causing rapid multipli- cation of one strain of blood and tissue cells in the body to the exclusion of all other cells of which the body is made up.

CANCER CAUSED OFTEN BY SKIN AFFLICTIONS

Cancers are often caused by affliction of the skin said Dr. Joseph Jordan Eller before the American Medical Association, says *Science News* of the most common of the skin diseases that cause cancer are from venereal diseases, skin diseases coming from overdoses of radium, moles, occupational skin troubles, skin troubles coming from handling arsenic or taking it internally, and various other inflammations of the skin. If black moles become irritated constantly they too can become a source of cancer. Such irritating moles should be removed, said Dr Eller. A number of occupations in which skin troubles may come are those connected with tar, gas works, etching, chimney sweeping, etc.

EXCLUSIVE MEAT DIET AIDED HEALTH OF SUBJECTS

After more than a year, as subjects in an exhaustive experiment, Vilhjalmur Stefansson, Arctic Explorer and R. M. Anderson, the two men have found that an exclusive meat diet is conducive to the health. The experiment which was under the supervision of a board of physicians showed that even though the men were sedentary, they had not only good health but also increased vigor and added resistance to disease. Anderson even found that after the diet was started his hair stopped falling out. During the experiment Stefansson was tested with an excessively high protein, mineral fat diet and he became ill. But on returning to the meat diet he recovered. The patients did not find the meat monotonous and although they had healthy appetites the meat served to satisfy it. They used black coffee, black tea and water as the sole beverages.

PHYSICS

DEVICE PHOTOGRAPHS SENDER OF FIRE ALARMS

In order to become acquainted with the senders of fire alarms, particularly of false alarms, a photoelectric device installed by the Photoelectric Fire Alarm Recording Company has been placed in a New York City alarm box. Mayor Walker of New York City sent the first alarm and was first to be photographed. The photographic attachment consists of an outrigger, to which is attached a camera, a bell and a siren.

PHOTOGRAPHING FOR TELEPHONE CONVERSATIONS

A device called a *recordiphone* is described recently in *English Mechanics* which will record conversations over the telephone. Thus it is hoped that many disputes over what was really said over the phone will be settled by evidence. The instrument consists of a microphone on the speaking side and a recording and reproducing device on the receiving. The device can be switched into the conversation at any time and shut off when desired. It can also be used for dictation without the presence of the stenographer. The record is reproduced on a wax cylinder and gives it is said a clear and faithful reproduction. Conversations as long as a half hour can be put on one cylinder.

NEW THEORY OF LIGHT PROPOUNDED

A new theory of light, says *Science*, has been propounded by Dr Herbert J. Brennan of Northwestern University, in which he seeks to explain it as corpuscles of matter itself. This is in distinction to the modern accepted belief that light is a form of wave motion of energy, and also to the theory that the electron is itself a wave phenomenon. But if one considers the two modern theories together, the idea of Dr. Brennan might be seen as reconciling them. Another theory that has held sway is the Quantum Theory which sets forth that light consists of bursts of energy or "quanta" instead of a regular wave movement of energy. However, inasmuch as electrons travel at only 150,000 miles per second and light has a speed of 186,000 miles per second there is apparently still a discrepancy in the electron theory.

ALLOY SHOWS HIGH MAGNETIC PROPERTIES

As the result of years of experimentation to obtain a material with very high magnetic powers, an alloy has been found composed of iron, nickel and cobalt, says G. Welman in the *Bell System Telephone Journal*. When these three elements are combined and given a heat treatment, magnetic properties truly remarkable have resulted. The discovery resulted from the addition of cobalt to a well-known iron-nickel alloy which was composed of 70% iron and 30% nickel.

STUDIES OF ILLUMINATION TO BE MADE IN GLASS HOUSE

An ambitious series of experiments to determine the effect on us of living within glass houses are to be made by the United States Public Health Service. A glass house is to be erected and various kinds of glass are to be used. The illumination within the house from the sun is to be measured hour by hour and day by day, just outside of the house similar measurements are to be made. The change in illumination therefore will record the effect of the glass. The effect of various types of wall colorings will also be studied.

The tests will afford experimental proof also of the claim of various glass manufacturers that their products allow the ultra-violet rays to penetrate while ordinary glass does not.

MICHELSON TO RE-TEST LIGHT-SPEED

The plans by which Albert Michelson plans to re-test the speed of light so that it shall be accurate to one part in a million were given in an interview printed in the New York *American*. In the previous experiment by which the speed of light was determined as 186,284 miles per second, this was correct only to 1 part in 100,000 as this experiment was made in air. The new experiment, if feasible will be made in a vacuum. A pipe-line half a mile long will be used, from which the air will be exhausted almost entirely. The light will be shot along the pipe to a set of revolving mirrors reflected and sent back five or six times. The time taken to make the complete course when multiplied by the speed of rotation of the mirrors will provide the basis for the recalculation of light's speed.

REVOLUTIONARY STORAGE BATTERY PREDICTED

News of a new storage battery which can charge and be discharged at an unprecedented rate comes from Ireland according to the United Press. The inventor, an Irish scientist, is giving the Irish Free State the benefit of it and experiments established by the government are on the way. The battery can drive a railway train for sixty miles, it is said, and will revolutionize transportation. Exhaustive tests of it are to be made in the near future. The inventor is James J. Drumm of University College, Dublin.

BLOCK PROOF X-RAY DEVELOPED

An X-ray machine completely insulated in oil and able to prevent patients from being shocked has been developed by the Victor X-ray Company. The first machine is being used in the New York Neurological Hospital. The Coolidge tube in which are generated the invisible rays of light which permeate the body and make photography possible, is concealed in the aluminum container filled with oil. An adjustable diaphragm permits the passage of the invisible rays by which "radiographs" are made. With the new device the patient may be X-rayed from almost any angle without moving him, thereby permitting the X-raying of badly injured people. This apparatus also permits the use of the X-ray at high altitudes without using double the power (which is necessary with the ordinary type of machine).

TWO-EYED CAMERA FOR MOVIES

On a screen 20 feet high and 52 feet long a demonstration of three-dimensional movies was given by the Radio Corporation of America at New York. The camera used for it has two lenses, the usual size of film being used. The camera, the Spoor-Berggren, resembles the ordinary motion picture camera except that the magazine cases are larger. There are two lenses instead of one. The image caught by the two is transferred to the film through a duplex lens system. The operation of the camera is quite the same as the two-dimensional. At the demonstration the usual film was shown, as a talking picture and then suddenly the three-dimensional film was projected in which everything took on its proper depth and spacing.

RADIO-TELEVISION

SUN-SPOTS DETERMINE RADIO RECEPTION

From the results of an exhaustive survey, Dr. Harlund T. Eastman, former Professor of Astronomy at Harvard University, and Dr. Greenleaf W. Pickard, prominent radio engineer, have definitely determined that sun spots exercise a potent effect on radio reception, said James Stokley in *Science News-Letter*. The result of their studies was the conclusion that the absence of spots in 1923 greatly enhanced the popularity of radio then, but we are now in a stage where reception is poorer than it has ever been. Not until 1934 with a new cycle in which sun spots will be absent again can we look forward to good reception.

The method pursued by the two investigators working in Cambridge, Mass., was to tune in on Station WBBM at Chicago with a superheterodyne set. An automatic recorder noted by means of a pen the intensity of the incoming waves. This mechanical intelligence gave an absolute record of the reception. At the same time at the Harvard Laboratory and the Yerkes, Mount Wilson and Naval Observatories daily records were made of the sun spots. The conclusion from comparison of the two records is that the stream of electrons shot out by the spots crossing its own magnetic field, crosses the field of the earth and from the interaction of the two a confusing magnetic disturbance is set up that hinders the transmission of waves. Furthermore the Kennelly-Heaviside layer is lowered by the effect of the sun spots. Another important conclusion arrived at is that there is no difference in the reception between summer and winter, as was previously supposed to be the case.

RADIO RECEIVED THROUGH STEEL [illegible]

As a means of distributing radio reception at a central point through a great number of receivers, Dr. F. H. L. Satterlee has perfected a method of using the steel girders of the building in which reception is to take place. At a recent experiment at the Hotel Lincoln, New York, the device was tried out and operated successfully. At a central point in the hotel six receivers got six different programs at once through a single antenna wire. The energy was passed through a series of electric oscillators which were connected with the steel framework. The receiving sets in the various rooms were then plugged into a wall socket and the program received through the girders. This guided radio, as it is called is expected by the inventor to be installed in hotels and steamship rooms. Radio System, Inc., of which Dr. Satterlee is vice-president is the owner of the device. The sets are to be made available to patrons just as any other commodity, for a rental charge. The test in the Hotel Lincoln is considered quite good inasmuch as only a few of the rooms can receive programs in the old way.

RADIO WILL REACH OTHER PLANETS SAYS DOMERGUE

By means of radio we will be able to communicate with other planets, said Gaston Domergue, president of the Republic of France to Joseph E. Sharkey, as recorded in the New York *World*. M. Domergue who is an ardent radio fan often sits up until late in order to get all European stations, and although the American programs do not come in until 3 A.M. (French time) he hopes ultimately to get them too. He states that in France they are beginning to concentrate on short wave reception.

RADIO STATION BROADCASTS AVIATION WEATHER DATA

The radio station WENY at New York City which has been purchased by aviation interests is now making a tri-daily broadcast of weather information which is gathered from seventeen weather bureau stations in the east and middle west. At 11:30 A.M., 3.30 P.M. and 5:30 P. M. Daylight Saving Time the data collected is broadcast for twenty minutes.

The report gives the visibility, ceiling, winds, wind velocity, temperature, barometric pressure, and other remarks on the weather at various flying fields. The service is expected to be extended as fast as is possible and ultimately it is believed by the management of the station that hourly reports will be made.

GENERAL

HARMED BY TOO MUCH SCIENCE

In connection with the "intellectual stock-taking of the world" to determine its needs, four interesting letters have been received by the American Philosophical Society pointing out warnings in our scientific preparedness. Sir Oliver Lodge warns against over-organizing scientific research, stating that individual work is often the best. Dr. Carl Barus of Brown University speaks for an advance in ethics and esthetics to catch up with science. Science itself, he believes, leads only to war, aggression and exploitation. Dr. Edwin Conklin of Princeton warns against specialization, or the break-up of knowledge into such small bits that progress will end, while Dr. F. W. Clarke of the Geologic Survey pleads for intellectual honesty.

SEES CRYSTAL CITIES IN THE FUTURE

The city of the future will be made of glass instead of brick, mortar and cement says *The Sun* (London) Although opaque to the eye, buildings and roads will be made of glass which admits all kinds of healthful rays from the sun and yet will not break or crack. Such strong glasses have already been developed. Cities will be enclosed within an outer glass covering so that our temperature shall always be maintained at an even predetermined point. We will have no snows or rains and rain only when we want it. All sorts of insects and pests will be absent from this idyllic place.

STRANGE FISH HAUNT OCEAN DEEPS

Fish "more strange than the eyes of man have seen" are described by Miss Gloria Hollister, member of the Bermuda Oceanographic Expedition which, under William Beebe, are conducting ocean studies off Bermuda. One fish described by Miss Hollister has eyes on stalks several feet long. The animal is enabled, thereby to have one eye looking forward and the other backward. Another fish is equipped with a set of red and another set of bright yellow light organs, presumably traffic lights. There are also luminescent sea dragons and fish who can change their colors in the sea to provide a more perfect protection against enemies. An electric gun is used by the expedition to stun the fish in shallow water and capture them. They are then caught and placed in the aquarium on board the ship.

SEES CELLULAR CITY IN THE FUTURE

A city having an area of 160 acres and having within itself everything necessary for its needs is predicted for the future by Clarence A. Perry of the Russell Sage Foundation in a Report of the Regional Plan of New York. The city will consist of a population which would require one elementary school. It should be small enough to provide easy walking from any one point in the city to another. Shops and stores would all be located conveniently to the city. The city would be a planned one in the real sense of the word with all buildings especially those devoted to commerce or trade located where they will not cause unsightliness, as well as inconvenience. By this sort of planning both utility and beauty would be served.

BRAIN CELLS MAY EXCHANGE DUTIES

The old belief that certain brain cells, or certain parts of the brain carried on certain of the mental duties and only those has been dispelled by Dr. Shepard Franz of the University of California. This will effectively shatter the old belief in mental ability being determined by the number and location of cerebral bumps. If a certain number of brain cells are destroyed in any way, says Professor Franz, their work can be taken up by others by re-education.

This was done actually in the rehabilitating of people who had been partially paralyzed through destruction of part of the brain. By re-education the normalcy of the brain could be restored.

MACHINE AGE NO MENACE

Far from believing that our machine age is a menace to greater human happiness Dr. William A. White, former president of the American Psychiatric Association believes that it is the means to the greater happiness of the race. Writing in the New York *Herald-Tribune* he refutes the idea that it has caused standardization. Machine-made products are so numerous that people of small means have a choice always denied them before. Not only good things to look at and wear but also books are so plentiful that everybody can have them. And while bad music is sent over the radio so is good, to millions who have never heard it before. Although our education tends toward standardization there are corrective forces at work. And the recent efforts toward disarmament have shown that the war of science 1914-1918 may not have been in vain, for it showed the true horror of what war can become.

INSECT MENACE GROWING SAYS ENTOMOLOGIST

The insect menace to our life is constantly growing said Dr. Charles T. Brues, Professor of Economic Entomology at Harvard University. Particularly in agriculture they have become the dominating factor to be contended with. Many insects feed on definite crops and the only way to starve them out is to stop raising these crops. This would mean ultimately that large scale farming, despite its economic efficiency, would have to give way to small farms again. The use of the airplane for more and more frequent travel between countrys will also aid in the spreading of new insects to feed in new lands. The only way to efficiently combat an insect that has already intrenched himself is to get another insect that feeds on the first. Although Dr. Brues would not say that the insects would destroy civilization he does see a very potent danger.

THREE-DIMENSIONAL COLORED FILMS NEXT

The film of the future, says Lorenzo Del Riego, in charge of the experimental laboratory of the Paramount-Famous-Lasky Corporation, will be three-dimensional with objects shown in their natural colors. Sounds will emerge not from horns back of the screen but from a diaphragm as part of the screen itself. The effect of color will be obtained through a process similar to three-color printing. The three images will be superimposed on one another by the use of three films. The screen will not be flat but will be curved.

MAXIMUM EARTH POPULATION PLACED AT 12 BILLION

With all the advances in science and technique of providing the necessities of life, it is hard to see how the human population could go over twelve billion in the conclusion of the Institute of the Harris Memorial Foundation. The present population is put at 1,700,000,000 to 1,900,000,000 and the population is increasing about five-eighths of 1 percent a year. With the possible arable ground and improvements in science the earth could certainly support 10,000,000,000 people with 12 billions placed as a maximum. And this figure could only be reached if there was a perfectly free possibility of migration. America would have to open her doors to 800,000,000 people as her quota. However, inasmuch as the population of the earth would only be double its present number in 130 years it would seem that four or five centuries must pass before the problem will become acute.

Science Questions and Answers

About Atoms and Electrons

Editor, Science Questions and Answers:

I have read quite a bit in your magazine, and especially in the story "The Marble Virgin" about all these atoms and electrons, etc., and as I have no formal scientific knowledge about chemistry I wonder if you would explain in a few words what they are. I have heard the statement made that "atoms revolve in orbits." I wonder if you would explain the meaning of that also?

Curtis Wendell,
Los Angeles, Cal.

(The statement that atoms revolve in orbits is not altogether correct. It was once thought that atoms were the smallest particles into which matter could be divided; that once a material was ground up or gasified or diluted, no matter how much, that an atom was the smallest possible particle. But within the comparatively recent past it has been discovered that atoms are composed of what might be called "charges of electricity." Each atom consists of a nucleus which has a positive charge and one or more electrons which are negatively charged particles. The electrons revolve at enormous speeds about the nucleus or proton in fixed orbits. The accompanying diagram will make that clear. In the first is shown an atom of hydrogen which consists of a nucleus and one electron revolving about it. The second diagram shows an atom of helium which has two electrons revolving about the nucleus. As is indicated, the orbit of one electron makes an angle of 120 degrees with the orbit of the other. An atom of neon would have ten electrons about the nucleus and heavier elements would have a greater number. Those who believe in transmutation of elements feel that if one or more electrons could be detached or added to an atom of any element that another element might be formed. They feel that, for example, if one of the electrons in the helium atom that hydrogen would result and vice versa.—EDITOR).

What Transports Sun's Heat?

Editor, Science Questions and Answers:

I would like very much to see a department of questions and answers in Science Wonder Stories. May I ask a question for a starter, if your space will permit answering it? How does the heat of the sun reach us through the absolute cold of space?

My idea is that sunlight is a flow of "something," particles even smaller than electrons, and when those particles of matter strike our atmosphere they are warmed, thereby causing heat. Is this theory right?

A. Molker,
Sydney, Nova Scotia, Canada.

(Science has not yet found absolutely the answer to what conducts the sun's heat across space. Heat, like light, is a wave motion, the sun's rays containing both heat and light [or the possibilities of heating and lighting a material object]. Since there is supposed to be no material in empty space [in fact light travels easier through a vacuum], the actual transporting medium is not known. Eddington, a distinguished scientist, believes that there is a material very finely diffused. Other scientists cling to the belief of the ether as a transporting medium.—Editor).

What Is Largest Star?

Editor, Science Questions and Answers:

I am only 21, so you may not care to publish this; but I am already a chemist, astronomer, and an experienced soldier (major of the reserve and first lieutenant of the National Guard. I thought maybe I could create a story that you would publish. I am trying now. Will you please tell me where I can secure Einstein's works, in English, not too abstruse, in full, and what they would cost me? Please tell me the speed of light, the largest star in the universe, and the relation (weight) of our sun to it.

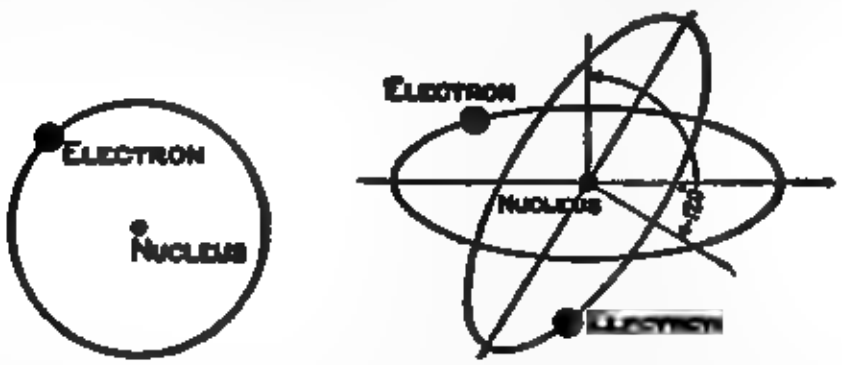
I have read Science Wonder Stories for the first two issues, and I think that more interplanetary stories would be better. Of course my idea isn't so much, but interplanetary stories seem to hold a thrill that is not found in the common stories of science fiction. And please tell me about Betelgeuse and its inhabitants; or would you like a story by a new author?

Thos. Morrison,
Binghampton, N. Y.

(We are always glad to hear from new authors, as we wish to give everyone with ability a chance to have his works published in our magazine. We will therefore be glad to look over Mr. Morrison's story.

The speed of light, according to present calculations, is 186,284 miles per second.

The largest known star is Antares, which has a diameter of about 480,000,000 miles, or considerably larger than the diameter of the orbit of Mars. Its diameter is more than 500 times that of our sun and its volume about 125,000,000 times that of the sun. But the density of the sun is about 1500 times that of Antares, so the weight would be about 800,000 times that of the sun. These figures are, of course, approximate.—Editor.)



(From "At Home Among the Atoms," by Kendall)
On the left is shown a diagram of a hydrogen atom with its nucleus and revolving electron and on the right the atom of helium with the nucleus and two electrons.

Distance of Vega in Light Years

Editor, Science Questions and Answers:

Here is one question I would like you to answer for me in the October issue of Science Wonder Stories:

If light travels at the rate of 186,324 miles per second how long would it take for it to travel to Vega?

I think "our" magazine is coming along fine. I am glad "our" artist Paul is still with you.

Ralph Hippensteel,
Girard, Ohio

(Vega is 169,000,833,000,000 miles away from the sun, and at the speed of light it would take a ray about 31 years to reach Vega—EDITOR.)

How Are Men Suspended in the Air?

Editor, Science Questions and Answers:

Recently I was troubled with sick headaches and was obliged to give up much of my reading (of which I did a great deal) and I was permitted to read only a few magazines. The main one I chose was Science Wonder Stories.

The "Menace from Below" was the best story in the July issue though not overly stocked with scientific facts.

"The Alien Intelligence" was entirely too fantastic and weird to have a place in your magazine. "The Boneless Horror" by Dr. Keller was fair but I wish you would explain his statement of some of the East Indians being able to suspend themselves in the air defying the laws of gravitation, he seemed to state this in all seriousness. Is it true?

George E. Bailey,
R.R. 5, Marion, Ohio.

(What Dr. Keller mentions about the suspending of people in the air by East Indians is, as far as we know, a fact. The science that they use to accomplish this marvelous thing is a trade secret among the fakirs. They first attain a state of rigidity in the subject and by the proper play of his muscles are able to make the subject susceptible to the operation. Just what the mystery is we Occidentals do not know. But rest assured there is a scientific explanation.—EDITOR).

What Is Einstein's New Theory?

Editor, Science Questions and Answers:

Allow me to make some criticisms on your first two issues.

In the July issue, you had three serials to two short stories. I think that this is an unfair proportion. I would suggest that you do not start a new serial until the old one has been finished.

2. Print the year number alongside the name of the month on the cover.

3. Dr. Keller is good, Jack Williamson is better, and Harl Vincent is best.

4. Fletcher Pratt and Irvin Lester are bad, Stanton A. Coblentz is worse, and Kennie McDowd is worst.

Capt. Hermann Noordung is O. K.

Hang on to Artist Paul. He's perfect.

Will you please tell me, in your new Questions and Answers Department, what Einstein is trying to prove in his new theory?

Ralph Epstein,
1290 Grand Concourse,
New York City.

(Einstein, in his new theory, believes that he has proved mathematically that gravitation and magnetism are results of the same forces. In other words, both gravitation and magnetism have the qualities of attracting objects with a force that varies inversely as the square of the distance. Magnetism, however, also exerts a repulsive force, while we have not yet found definitely anything in gravitation that repulses. However, they both operate through fields of influence and in the main their phenomena show a striking similarity. The conclusion to be drawn from his theory is that if they are the same, then we should be able to shield objects from gravitation just as we do from magnetism. Thus we should be able to conquer gravity.—Editor.)

What Happens in Outer Space?

Editor, Science Questions and Answers:

I hope you devote a page of SCIENCE WONDER STORIES to answering various science questions your readers would like to have answered. Here goes one of mine:

Space is said to have the temperature of absolute zero. Absolute zero being the condensation of any gas, liquid or solid to an absolute zero density. The nearest to absolute zero that has ever been approached is one-third of a degree. If you loose a gas in space such as hydrogen, which once liberated escapes out of your atmosphere, at least is supposed to do so unless heated in which case it combines chemically with oxygen to form water or H2O. If a gas was loosed into space, instead of covering millions of miles it should condense to zero density. If you answer that the light from the sun striking any solid will produce heat, my answer is why would a man clad in an air helmet with body exposed freeze to death instantly. I hope you can relieve me on that point.

Morris Kessler,
261 Monroe St.,
New York, N. Y.

(In the first place absolute zero is supposed to be the point at which the molecules of a substances are perfectly quiet, in other words there is no internal motion of its elements. There is no question in this connection of a substance being at "zero density". That is if an object possesses weight it will have a density which is the weight per volume. That an object in outer space may not possess weight is not to be taken as being [illegible] by the low temperature of outer space. The cause for weightlessness is only the absence of any gravitational force.

If a gas were suddenly loosed into outer space the gas would of course expand by virtue of the kinetic energy of its particles. As its heat was abstracted by its expansion and by the intense cold of space the gas would probably become a solid immediately without passing through the state of liquefaction. Such a thing happens with carbon dioxide which when rapidly cooled and expanded turns to a sort of snow.

If the substance is then cooled further to absolute zero it would mean that the molecules had lost all their internal energy and would be perfectly still. Remember that it takes time before a substance completely loses its heat even in outer space.

Inasmuch as it does not need a relatively low temperature in order that a man may freeze to death, if his body were exposed in outer space, the process would be practically instantaneous. —EDITOR).

Something About Atlantis

Editor, Science Questions and Answers:

I have just finished the July issue of SCIENCE WONDER STORIES. I have the June issue also. It sure is "some magazine." May I ask two questions?

1. What, where, and what happened to Atlantis?

2. What other great countries were there at the time of Atlantis?

"The Problems of Space Flying" is very interesting but I wish the author would explain how he proposes to get up there.

I like your idea of taking your cover from the editorial.

Your "Science News of the Month" is all right, keep it up.

Well, I'm through throwing brickbats and bouquets so good bye and good luck to your [illegible]

Harris Mathewson,
Buffalo, N. Y.

(The story of Atlantis has never been verified actually. It finds its way to us through Greek sagas and Plato deals with it extensively. It was supposed to exist about twelve thousand years ago and according to all reports it had a high degree of civilization. Plato called it an ideal commonwealth. About 11,500 years ago the sea was supposed to have swept over it.

Greece and Egypt both existed at the time.

The location of the country has never been really determined although the best authorities place it as just west of the Mediterranean.—EDITOR).

The Edison Star

Editor, Science Questions and Answers:

I have had a few arguments with some people on the following topics. Will you please print the answers to them in the columns you are giving to "Science Questions and Answers," in order that we may see who is right.

1. Is there such a thing as an Edison Star?

2. If there is, did Edison put it up in the sky?

3. How close is the moon? The nearest planet? The nearest star? in miles.

I claim that Edison never put a star in the sky. Even if he did, we couldn't see it. The people I argued with claimed it's the brightest star. Your answer will determine the question. I thank you in advance.

Frederick Shapiro
Brooklyn, N. Y.

(There is no star known as [illegible] We assume that when you asked if he put it there you mean did he discover any. He [illegible] to our knowledge. The average distance of the moon from the earth is 240,000 [illegible] The distance of the nearest planet, which is Venus, varies between 25 million and 63 million miles. The nearest star is Alpha Centauri [illegible] about 23 million million miles or 4 light [illegible] away. The star with greatest absolute brightness to our knowledge is Rigel.—EDITOR).

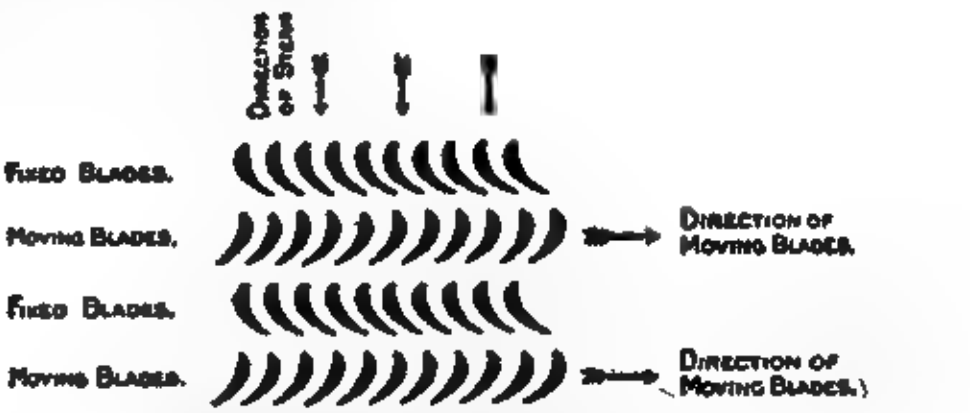
About the Steam Turbine

Editor, Science Questions and Answers:

Could you indicate, through a diagram or otherwise, just how a steam turbine operates. In other words, how does the force of the steam actually propel the turbine wheels. I have been having quite a discussion with my friends about it and would like you to settle the question for us.

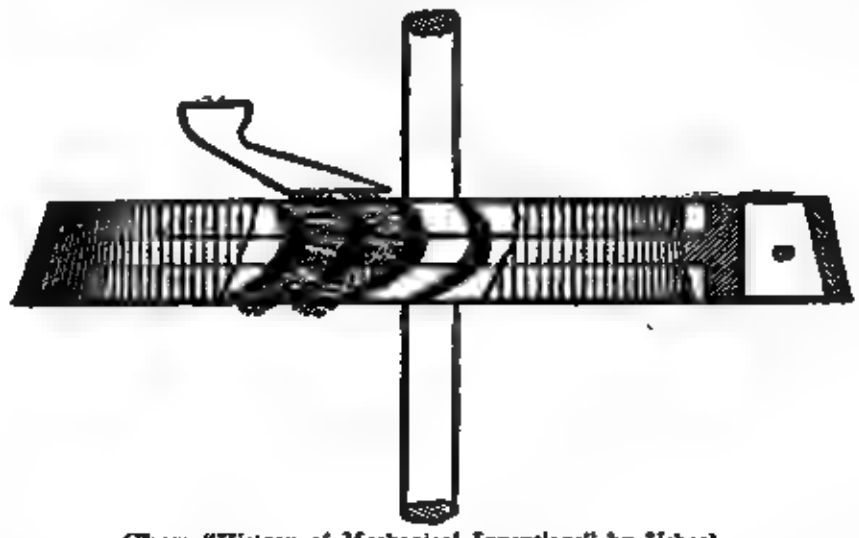
James Watson,
Memphis, Tenn.

(The illustration shown here will answer Mr. Watson's question. The steam is led into the turbine against a series of fixed blades. Their angles are so arranged that they will deflect the steam against a series of moving blades. It pushes, and therefore rotates the blades and the turbine wheel in the direction indicated. The steam is deflected from these to another series of fixed blades and from them to another series of movable [illegible] Thus the steam has exerted a force [illegible] to propel the turbine wheel. In a modern turbine there are a great number of series of fixed and movable blades and thereby the steam pressure is utilized to the maximum. In each succeeding series however the steam exerts less and less force for it has been gradually giving up its energy.—EDITOR.)



(From "History of Mechanical Inventions" by Usher)

A view of the Parsons Turbine showing the direction of steam and the fixed and movable blades against which the steam impinges.



(From "History of Mechanical Inventions" by Usher)

A plan view of the Parsons [illegible] Turbine. Here the steam shown by the dotted lines hits the turbine blades, which move on and the steam leaves at the bottom to enter another series. The steam exhaust is shown at E.

Distance of Alpha Centauri

Editor, Science Questions and Answers:

Your magazine, SCIENCE WONDER STORIES, is to my estimation the best science fiction magazine yet. However, I have a suggestion to make. Why not dramatize one story a week from the current issue of your magazine over the radio?

One question and I'm finished. How many light years away is Alpha Centauri?

Leonard Miller,
New York.

(The dramatization of a science fiction story would necessarily be difficult because there is not only action in the stories but also description that calls for thinking and concentration. However, the suggestion is welcome.

The distance of Alpha Centauri is four light years or about 24 trillion miles.—Editor.)

Variation in Weight Above Sea Level

Editor, Science Questions and Answers:

I read the article on the wonders of gravitation. In the July issue. It was interesting.

My real reason for writing this letter is that I have a problem that I cannot solve.

I would like to know what the variation of 10 lbs. would be at 3 miles elevation. In other words how much less would 10 lbs. weigh at 3 miles elevation than at the earth's surface?

Paul Stripling,
Hamburg, Penna.

(If the weight is assumed to weigh 10 pounds at sea level where the diameter of the earth is assumed as eight thousand miles, then at a point 3 miles above sea level the ten pounds would weigh 9.989 pounds or would suffer a loss of weight of 11-1000 of a pound.—EDITOR).

How Stellar Distances Are Measured

Editor, Science Questions and Answers:

I have read much about the vast distances that fixed stars are from us and wonder just how astronomers are able to determine these terrific distances. Would you please answer through your new department.

Lester Stanley,
Binghampton, New York.

(The method of determining stellar distances in most general use is that of triangulation. The diagrams accompanying will make this clear. In the diagram (1) are indicated the earth, the sun and the star whose distance is to be measured. Now at a certain time the angle (a) that the star makes with the sun is measured. Six months later when the earth is just opposite the position it formerly occupied, the angle the sun makes with the star is measured again. This angle is b. Now knowing these two angles the third angle (c) of the triangle just formed is known—for the sum of the three angles always equals 180 degrees. Now the distance of the earth to the sun is also known, as 92,000,000 miles. That makes line d called the baseline equal to 186,000,000 miles approximately. From the knowledge of the three angles and the baseline, by trigonometry the lines e and f each of which represent the distance to the star can easily be calculated.

If the star is one of the very distant ones, however, the baseline will be so small as compared with the distance to the star (see second sketch) that the triangulation method cannot give accurate results. Then distances are estimated by spectroscopic means [analysing the spectrum of the stars.]—EDITOR.)

When Will the Sun Be Extinct?

Editor, Science Questions and Answers:

This is far questions column.

1. At what rate is the sun's power of heat diminishing? How soon will it be extinct?

Burt Kendall,
Brooklyn, N. Y.

(The amount of heat given off by the sun has been calculated to be equal in one year to that produced by the burning of four hundred sextillion tons of the best anthracite coal or enough every minute to melt a cube of ice 2500 miles long, 2500 miles wide and 2500 miles high. However, the emanation of this prodigious heat does not seem to appreciably cool the sun, and it is believed that the sun is constantly being replenished by its internal action, by the liberation of energy in the changing of one element to another. It has a supply of energy, it is believed, to allow it to go on as it is for many billions of years at least. —EDITOR).

Strange Lunar Phenomena

Editor Science Questions and Answers:

Last night the sky was extremely clear, and the moon seemed to be shining twice as bright as usual, as it was a full moon. Lacking a good telescope, but having a pair of 40 mm. binoculars, I thought I would view the moon for a while. Regularly, I have to wear glasses, but with the binoculars I could not. After viewing the moon for a while, my eyes began to hurt somewhat, but I noticed a light orange rim around the top of the moon and a light blue one around the lower part, so I continued looking at it. Finally, the red, orange and yellow of the spectrum appeared around the top in a rim, the orange being most prominent, and the green, blue and violet around the lower part, the blue being most prominent there. Thinking that my eyes were playing me a trick, I rested them for a moment, and then viewed the moon against through the binoculars. The same thing repeated itself with my eyes hurting slightly again. Could you please explain this, as I am interested in knowing why the colors were formed.

"The Problems of Space Flying" is one of the most interesting articles that I have read in a good while. I should think it would be worth your while to continue such articles as these. They will increase the value of your magazine exceedingly. Space flying at present, I should think, is possible except for one thing: the meteors.

I am enclosing an article which I found in the New York *American* on the secret of bee jelly. I wonder if Dr. Keller read this before he wrote his "The Boneless Horror!" The two seem to coincide very much.

Carlton J. Cook,
Corbettsville, N. Y.

(The effect Mr. Cook describes is undoubtedly a peculiarity of binoculars. Some of them by their construction have a sort of prism effect and thereby break up the colors into their spectrum, acting thereby as a spectroscope. The editor has often noticed these effects himself.—Editor.)

Is Space Hot or Cold?

Editor, Science Questions and Answers:

I was first attracted to your old magazine by the cover, so keep it up. Your departments are fine—your article, "Science News" and "The Reader Speaks."

I certainly can't see the criticism of scientific points in your stories unless they contradict facts, which is very rare. I don't read for a subject for criticism, but for enjoyment and education. I am making science my life work, though my education is not yet finished, and I get much aid from your magazine. By the way why not start a Discussion Club, announcing a subject one month and printing reader's letters on it later? Such subjects as "Is Space Cold or Hot?" could be used. Personally, I believe it is neither! This may be a strange statement, but consider—heat waves are continually rushing through space, not warming it, of course, for there is nothing to warm, but when these waves strike a solid object, they heat it unless it reflects them. Now a space flyer would not have to be heated, it would have to be refrigerated! Its heat would not radiate off into space, for when an object loses heat, it must go to warm another object, as when a hot iron is plunged in water, it is cooled; but the water is heated. In space there is nothing to heat, so a space flyer would not lose its heat, but would acquire more unless cooled by refrigeration, being polished, not be warmed by the sun's rays. Am I not right?

Frank Snyder,
Pecksville, Pa.

(Mr. Snyder's version of the conditions of outer space is only partially correct. We know that the sun radiates heat, so that is evidence that heat can be dissipated even though there is nothing in the immediate vicinity to receive it. The presence of a greater amount of heat in our body than in one next to it means a potential difference exists, a tendency for heat to flow. Therefore there will be waves of heat flowing from the hot body out into space. They will travel until they find some material object to heat. Therefore the side of a space flyer turned toward the sun would be very hot and the side turned away would be very cold. This is described very well in the "Problems of Space Flying" [illegible] in the July, August and September issues of "Science Wonder Stories."—Editor).

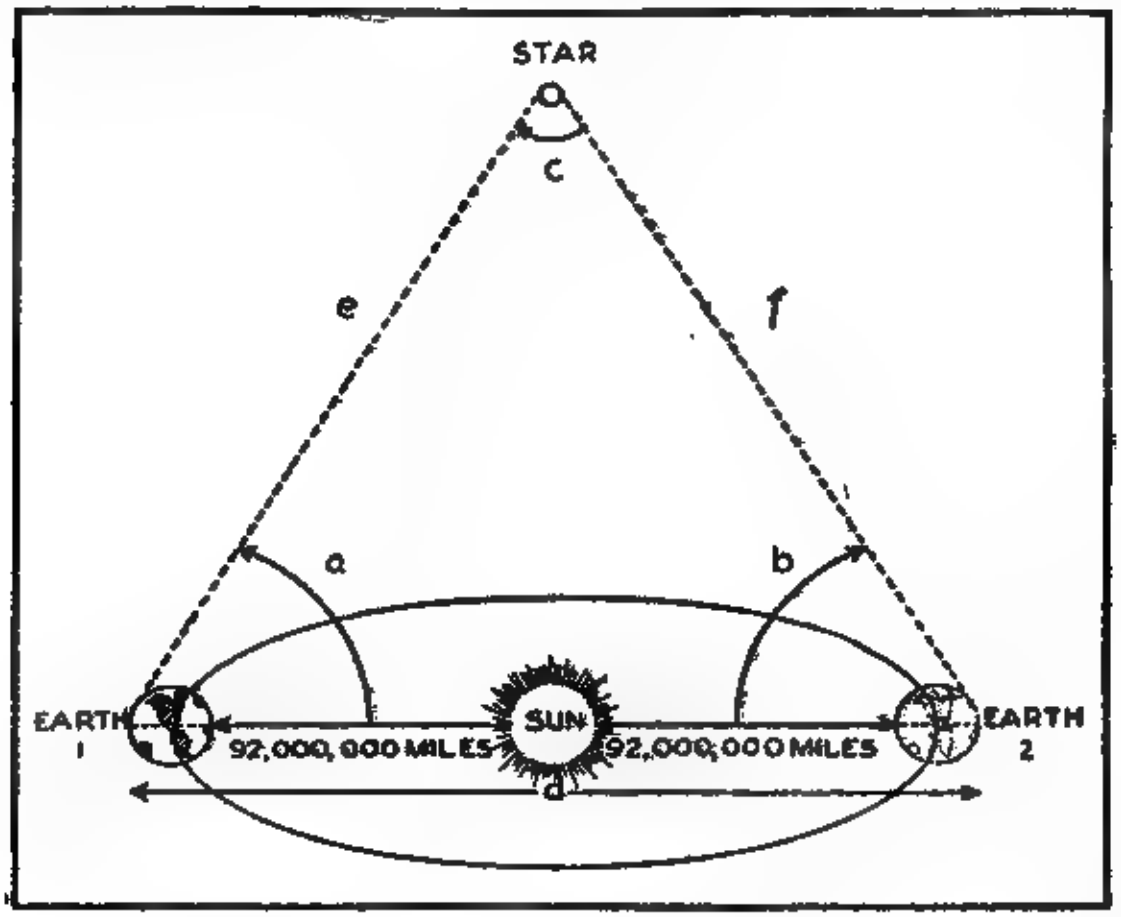


Figure 1. Showing how stellar distances are measured by triangulation.

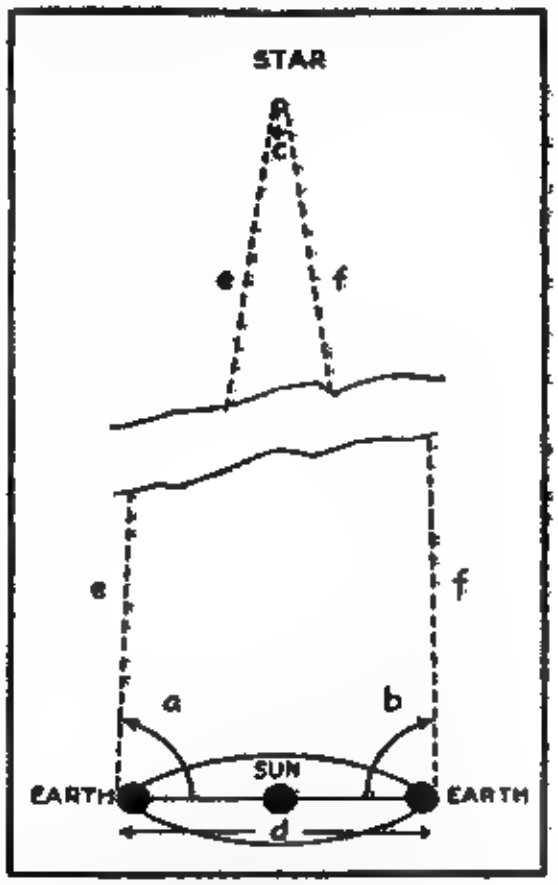


Figure 2. Showing how in the case of very distant stars the angles a and b become practically 90 degrees and therefore the triangulation method fails.

In this department we shall publish every month your opinion. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brickbat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 10c in stamps to cover time and postage is remitted.

The Difference Between Truth and [illegible]

Editor, Science Wonder Stories:

Your efforts to serve the readers and to give them the most possible for their money cannot be praised too highly. Summing up my opinion in general, let me say that beyond a doubt Science Wonder Stories is the best science fiction journal in existence. I say this unreservedly.

This first paragraph of praise does not mean, however, that there are no improvements to be made. In order to counterbalance the above statements, and perhaps to save the management from the cost of longer stand here, I will naturally have to add a few words of criticism. I believe you are still making the mistake of endowing the magazine in too lurid covers, covers that fairly shriek the word "trash." In the first place, the colors are not well chosen. I appreciate the fact that bright colors attract the customer's eye, and yet I find that other magazines accomplish this purpose without using colors which would tend to cheapen them. I also am inclined to think that the covers used for cover illustrations are poorly chosen. You know that the ordinary layman will usually be frightened away by such unheard of, impossible pictures. He needs to be gradually accustomed to the wonders of science fiction. He needs to be acclimated, so to speak. By using slightly more reasonable subjects for illustration, you would succeed in establishing a connection between the brilliant visions of science fiction and the grim reality of everyday existence. When such an impression is made he will more readily take a chance on trying it out. Once he has read an issue, the battle is won and the victory achieved. This argument is presented partly from a personal motive. I am having some difficulty in convincing my parents and my friends that science fiction is anything but trash. Decent covers would make this problem much easier.

Now let me comment upon your publication from the standpoint of its value as literature. The question has arisen in my mind, "just what is the difference between good and poor literature, more narrowly, good literature and trash?" I have come to the conclusion that the difference is just this: literature accomplishes a purpose, trash just tells a story; literature leaves a lasting thought in the reader's mind, trash simply gives a "thrill" for the moment. Too many times science fiction stories do not come up to the standards of real literature. So many of your authors merely relate some weird, impossible incident, with little or no scientific background, apparently just for the pleasure of telling it. This is why, in my opinion, Dr. Keller stands head and shoulders above most of your other authors. He chooses a comparatively simple plot, but makes the narrative count for something. So let me suggest that you be a little more discriminating in your choice of stories.

It would help considerably if you would inform prospective authors, maybe through the columns of S. W. S., of the requirements of a good story, both from the standpoint of science fiction and from that of literature. I suggest also that you demand a better grade of science in the stories. Too many authors seem to think that if they write a lot about X, Y, and Z rays, atomic disintegration, shining metal apparatus, peculiarly shaped vehicles, etc., that they have revealed scientific facts.

Kenneth Johnson,
Clinton, Iowa.

(We think that Mr. Johnson will find that every art has had to pass through the stage that science fiction is going through now. The story has usually come first and the meaning of it has arrived afterwards. As more and more authors acquire the ability to write science fiction they will be searching deeper and deeper for newer meanings—as Doctor Keller is doing. And the standard of excellence, which is already so high, will become higher and higher.—*Editor.*)

"The Human Termites" Has Stupendous Meaning

Editor, Science Wonder Stories:

So far, the September issue, in my judgment, is the best of them all. First comes "The Human Termites." It has a stupendous meaning between the lines. There is a hint that these things may be taking place at this moment. From the facts that science has learnt of this mysterious animal, the things he predicts seem highly probable.

Incidentally, Dr. Keller title fair to become my favorite author.

A close second comes "The Onslaught from Venus." It contained a lot of science as well as fiction.

"The Radium Pool" second installment made up for the first and puts it on the list as third.

"The Cable City" ending makes it just about even with Ed Earl Repp's story. Otherwise it would have been third.

I will have "The Problems of Space Flying" out. I think it ought not be in a fiction magazine.

Mr. Gernsback, will you please continue your wonderful editorials? There's a wealth of knowledge in each.

Sidney Eisher,
Brooklyn, N. Y.

(We have had a perfect flood of letters of praise on the "Human Termites." It seems to have taken our readers by storm. They will find, however, that the power of the story grows, the second and third installments becoming increasingly greater. It's a wonderful story.—*Editor.*)

From a Student Electrical Engineer

Editor, Science Wonder Stories:

Just a little appreciation for the enrollment of the magazine you offered me a shorter subscription of. In my opinion, it surpasses any other and reveals your master touch. I heartily approve of all your authors and the manner in which the magazine is now edited. I had my first experience with you and the "Experimenter" in 1913 and remember Baron Munchausen especially. However, I did not have the good fortune to read Ralph 124C 41+, although I heard of it from some of my friends. I would appreciate a copy of it or information leading to its [illegible].

The "Alien Intelligence" is an excellent story and all of them printed so far have shown a high standard. "Reign of the Ray" was very good but hard reading because it was so disconnected. "Menace from Below" very good but too short; seems to me Vincent could have made a real story out of the material.

I will be a Junior in college—University of California—in September.

The science in most of the stories is an inspiration to me in my studies in electrical engineering.

Ted Moore,
Los Angeles, Calif.

(We are glad to get this letter from a student, and to learn the value to him of the science contained in our stories. He will find that the stories are written by men who are not only well-trained in science but who have a mastery of it. The instinctive understanding of scientific principles is necessary to a writer of science fiction. For his lack of understanding becomes painfully apparent to our critical readers. "Ralph 124C 41+" can be obtained from the Stellar Publishing Company in book form. The price is $2.00.—*Editor.*)

Another Analysis of Our Stories

Editor, Science Wonder Stories:

Since I am already a subscriber of Science Wonder Stories, I think it will please and interest you to know my opinion of it. Science Wonder Stories is the real science fiction magazine, the genuine article. Its name is a very fitting and appropriate one. I voted for "Science Fiction Stories," but now I see that it was not the best choice. I must congratulate you on your foresight and mental discrimination of the various titles submitted to you and the selection of the best one. This title, I feel sure, will satisfy your readers and will save you many of their complaints.

The cover pictures by your artist Paul were drawn wonderfully, as usual, but why did you ask him to draw illustrations for your editorial "The Wonders of Gravitation?" and the article "The Problems of Space Flying?" There was much better material in the July and August issues for him to illustrate. I like my cover pictures to be like the first and fourth issues of S. W. S., that is, drawn from the fiction stories.

Now, regarding the fiction stories, I have divided them into five classes, following the method in our high schools:

A means excellent; B means good; C means fair; D means passable and F means failure, below the required average.

The following stories, in my opinion, belong in the A class:

"The Diamond Maker." Wells is at his best in short stories.

"The Warriors of Space." This story would have been perfect if James Morhaul had not put so much love in it. But anyway it was good.

"The Alien Intelligence." Hold out to J. Williamson.

"The Feminine Metamorphosis." It gave me a humorous feeling when I had finished it.

The stories belonging in the B class are:

"The Reign of the Ray," by Lester and Pratt.

"The Threat of the Robot." Dr. Keller always endeavors, it seems, to teach us a lesson in a story.

"The Moon Hoaxe." W. Locke deceived me. I thought the heroes of the story would have some adventures on the moon until I read the story. I forgave W. Locke, though, when I finished the story.

"The Radium Pool." This story by Ed E. Repp made me rather sorry for Alice Lane, her father and Drittle' Bands. The conclusion of the story made me rather sad, but then things don't always get along the way we wish them to.

"The Eternal Man," by D. H. Sharp, was good, though rather short.

"The Onslaught from Venus," by F. Phillips.

(Continued on page 463)

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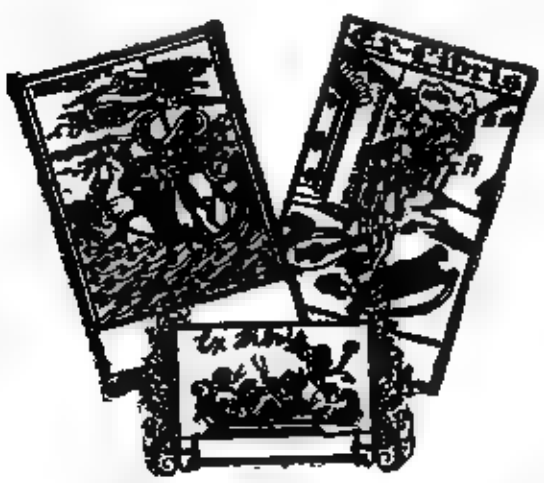

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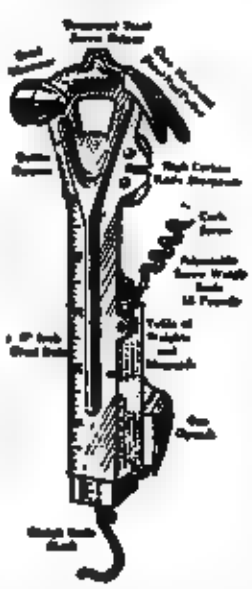

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New York, N. Y.

The Reader Speaks

(*Continued from page 466*)

was better than his "Airlords of Han." [illegible] want more of this kind.

In class C belong:

"The Making of Misty Isle," by S. A. Coblentz, would probably have been fine if there was more human action in the story.

"The Boneless Horror." It seems to me that Dr. Keller can write stories on the most trival things and the stories are good as may be understood by reading the "Boneless Horror."

"The Menace from Below," by Harl Vincent, would have been much better if he had left out the love "stuff."

"The Cubic City," by Rev. L. Tucker, was a pretty fair bit of humor.

I placed no story in the D class and only one in the F class and that was "The Marble Virgin," by MacDowd. I believe this story should not have been given a place in Science Wonder Stories.

Louis Kurzeja,
Chicago, Ill.

(Mr. Engel really started something worth while in the September issue when he gave us a clear analytical classification of the stories he has read in Science Wonder Stories. This letter of Louis Kurzeja follows the same plan with a short reason for the classification. We have received quite a number of such letters and are printing as many of them as possible. As Mr. Kurzeja will note, there are illustrations accompanying the questions and answers whenever an illustration is possible. At present no interplanetarian stories are planned for Air Wonder Stories.—*Editor.*)

A Terrible Indictment

Editor, Science Wonder Stories:

How can a man like you, who monthly steals fifty cents from the pockets of poor working people keep from being given life in Penitentiary of Happiness?

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The least you ought to get is a profit of a hundred thousand pennies per day.

I can imagine you leaving your office, stepping into your Rolls-Rice and, guarded by two hundred officers, start for home. Crowds are lining the streets singing praises and throwing beautiful flowers at you. Now and then a rival tries to get to you to make you sign a contract for ten or twenty thousand dollars a week to edit his magazines, but is repelled by the faithful guardians of the law.

As you pass through Wall Street you receive a shower of gold bricks, which land in a neat pile on the back seat of the "Rice."

Such is the home-coming of a champion.

Let me tell you of some of the misery you must cause in this world. Suppose you were a nice delicious apple pie being cooked in the hot oven. The mail man appears with Science Wonder Stories, and while Mrs. Cook is reading Ed's "Radium Pool" to see if Drift-in' is united with Allie you get nicely burnt.

Or suppose you are a tired business man and have spent the day having your three stenographers read you the new Science Wonder and Air Wonder Stories and on arriving home find your wife has not yet finished "Flight in 1999," and you must wait another hour before she can begin opening the canned chicken for the chicken supper.

Take the poor ditch digger, who left school at the tender age of eight to support the family. He stays up until three o'clock in the morning reading the two magazines and does not study his correspondence course on Modern Foremanship. When the boss comes from New York to interview him he (the digger) is told he must wait another week before being advanced.

Ain't you ashamed?

The ideal of an "Aviation Forum" in Air Wonder Stories is very good. Please think over the following: It also applies to Science Wonder Stories.

(*Continued on page 469*)

The Reader Speaks

(Continued from page 468)

Give us at least eighty pages of stories. You can then devote the other sixteen to the "Aviation Forum," "Aviation News" and "Reader Airs His Views" and ads or "Science Questions and Answers," "Science News," "Reader Speaks" and ads. Also a small non-fiction article on "The Airplane of the Future" or part of a good non-fiction book could be put on these sixteen pages.

If a book is to be published it should be run for six issues or twelve. They should begin with issues No. 1 or 7 and end with issues six or twelve. The reason is that a number of people do not want non-fiction articles in a fiction magazine and others do. I believe even the kickers will pay fifty cents for 160 pages of fiction even if the other thirty-two are non-fiction.

I have quite a few science fiction stories of my own. Of all I have ever read I think I can put the best in this order:

1. George Allan England's "Darkness and Dawn;" please publish it, although it will take six issues. I have read my copy about four [redacted].
2. A. Merritt's "The Moon Pool."
3. Jules Verne's "The Chase of the Golden Meteor."
4. A. Merritt's "The Ship of Ishtar."
5. George Allan England's "Fatal Gift."

Those who really want to read a good science story write to Frank A. Munsey Company, 280 Broadway, New York City and ask for "All Story" issues of Sept. 4-22, 1915 containing "The Fatal Gift" and enclose 30c. You will not miss the money!

6. Smith, Garrett, "Treasures of Tantalus."
7. Smith, Edward Elmer, "Skylark of Space."
8. Servies, Garrett P., "Second Deluge," and "Columbus of Space."
20. Windsor, G. McLeod, "Station X."

I cannot fill in between 8 and 20 because there is none as good as the first six.

Please make a better binding, my September issue of SCIENCE WONDER STORIES is almost in pieces and AIR WONDER STORIES is even worse. I expect to have SCIENCE WONDER STORIES and the QUARTERLY bound, but there are those who will just keep them on file as I expect to do with my AIR WONDER.

I hope you will follow my suggestions in my last letter and end all serials at either number six or number twelve. I agree with Mr. Shilito that "The Reign of the Ray" should have been in just one issue. That would have given an interesting novelette.

I wish the new babies the best of luck.

Curtis Taylor,
Utica, N. Y.

(This is quite a terrible indictment that Mr. Taylor puts on us. To disrupt so many domestic affairs, to interfere with business and to obstruct traffic [as he infers] makes crimes enough to put us away until the twenty-eighth century. The consolation would be, however, that we could then be released to find many of the things our writers have pictured really coming to pass. But meanwhile, unless we are apprehended, we are committed to going on putting out the same magazines [or more] and causing so many people to get hours of enjoyment and instruction each month.—*Editor.*)

Another Classification

Editor, Science Wonder Stories:

Perhaps you would allow a 17-year-old reader to comment on your new magazine. I have just finished reading the September issue, and it sure is a pippin. As a matter of fact, I think it's the best issue that has appeared so far. "The Human Termite" is the most astounding story I have ever read. I agree with you in the belief that it is Dr. Keller's best effort. However, please try to avoid publishing stories in three parts. It is very annoying for one to wait two months to finish a story; it's bad enough to wait one month. "The Onslaught from Venus" is one of the best short interplanetary stories I have ever read. "The Radium Pool" turned out to be an excellent story, a great deal better than I expected it would be. However, I would like to see a sequel; surely Mr. Repp is not going to let the Jovians get away with what they did. "The Cubic City" was a mediocre story in my opinion.

A good feature in the September issue was the interesting letters from the readers. I agree with Mr. Eagle's classification of the stories with two or three exceptions. On the strength of the second part of "The Radium Pool" should be put in the "A" group. On the other hand, I think that "The Reign of the Ray" and "The Marble Virgin" ought to be classed as "C" stories. The former was a very poor attempt to imitate H. G. Wells, while the latter was trash, having no literary value. "The Human Termites" and "The Onslaught from Venus" should be added to the "A" group, while "The Cubic City" should go into the "C" class. I think that "Problems of Space Flying" is a valuable article.

I noticed that one of your readers suggested that you reprint such stories as "The Moon Metal" in your Science Fiction Series. Permit me to second that suggestion. I never read "The Moon Metal" or "Station X" but I have read so much about them that I would like to read them. How about giving this question some consideration?

I am eagerly looking forward to your future issues because you've dropped some hints that they're going to be good. Anyway, keep up the good work.

Eugene Klawiter,
Pittsburgh, Pa.

(Mr. Klawiter touches on a subject which is unfortunately one that has its limitations. We would like to print complete stories even the long ones; but then we would have to give our readers fewer stories. We want them to get a selection, for in each issue there are some stories that are liked and others not. The writer is correct in calling the "Human Termites" an astounding story. It is one of the finest that has yet appeared. We believe that Dr. Keller writing in Science Wonder Stories has struck a pace that will stand by for any of his past efforts.—*Editor.*)

When We Become Civilized

Editor, Science Wonder Stories:

Enclosed is another subscription that I have obtained among my few friends.

Allow me to extend my heartiest congratulations to you on your magazine. It was more than I had expected—though really—I should have realized from past experience, what you can easily accomplish. I must also thank you from the very bottom of my appreciation for publishing my eleventh hour and hasty letter that concerned science fiction stories and your new magazine. It has made me very proud and happy to see my thoughts and views put in print.

At a very early age I began to doubt the religion in which I was rather forcefully compelled to adopt. Little by little I acquired the truth and knowledge that science afforded—until I passed the stage of agnosticism—to my present belief—atheism. Religion is all right when concerns our morals and behavior, but it makes slaves of us when we have to worship and defend our false "gods," "prophets," and "saviors." We are told that our Christian God is the "one" god—if this could be a fact—why are there Mohammedans, Buddhists, Confucians, Pagans, and Hebrews, not to mention the countless other beliefs scattered throughout our little world? Why are our greatest scientists Deists, Agnostics and Atheists? If "our" god is the one and only—why are we not convinced—why is the world not convinced—? We are as bad or worse than the ancient Greeks and Romans who worshipped their numerous gods and goddesses. We have substituted Zeus or Jupiter for Jehovah, and all our "saints" and "ladies" are merely new names for the lesser gods and goddesses of the ancients. We worship and pray to idols—they may be representations of men that may have lived at one time, but it is to be considered that Zeus, Apollo, Venus, Ishtar, Buddha, Varuna, Ra, Ceres, Osiris, Krishna, Ra, Thoth, Yama, Vishnu, Hermes, etc., etc., either had mortal lives or mingled with and loved and associated with mortals at one time or another.

When science and rationalism equips our "civilizations" with free thought and truth—when we can put away and bury our hags-

(Continued on page 478)

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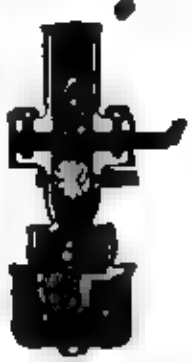

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The Reader Speaks

(*Continued from page 469*)

been as Santa Claus, the Stork, Fairies and like childish fantasies that have been disregarded with our maturity—then we can call our minds "civilized."

Stanley G. Stolte,
Indianapolis, Ind.

(We can agree heartily with most of what Mr Stolte says here. The question of agnosticism [the doubting of the existence of God] and Atheism [the actual belief that there is no God] are questions on which many, many tomes have been written. That scientists cannot be religious, we believe, is a fallacy. Any man with a breadth of mind to encompass all science may easily see a plan to the universe. He may say that the Plan originated through Chance. Then his God may be Chance. Or he may see in it the work of a Master Creator. Of course this religion has nothing to do with the formal creeds into which the religions have arranged themselves. And to answer Mr. Stolte we might say that really the various religions do not each claim that God is his own, but each has his conception as to what God is like. Man has always found it necessary to personify his ideas about life, and the personification of those ideas he called God.

Religion has signally failed only when it attempted to stifle the free play of the mind. By a mistaken notion that faith can be sustained by force, religions have bred within themselves the seeds of their undoing. With true religion that which seeks for a plan to the confusion of life, no one can have any quarrel. It is only the mind-stifling dogmatic, inflexible creeds of a single road to salvation that arouse the protests which Mr. Stolte makes here.—*Editor.*)

Announces Mr. Malaire!

Editor, Science Wonder Stories:

Although this letter is destined for the waste basket, yet I hope you might publish in "The Reader Speaks" department. The main reason why I want to see it in print is to get in touch with A. B. Malaire (address not given) who writes in the August issue of "Ow" magazine concerning a Science Correspondence Club. How I'd like to make that twenty-five members, twenty-six!

So please put this somewhere so Mr. Malaire may see it (not in the waste basket, kind sir).

Not for just a pastime am I writing this, as (presumptious person that I must seem) I want to offer Mr. Malaire a few suggestions.

First, after the officers have been selected, why not have them draw up a constitution for the club, then invite all science fiction fans to join it?

Second, realizing, of course this might create confusion, there would have to be local branches, as the club grows, with separate officers.

Third, after the club has been established, say in five years, why then could we not have a national convention?

Fourth, this convention would bring the readers together, dues rates could be fixed, which dues (if passed by the convention), could be used in various ways.

Fifth, these dues could be used in purchasing scientific apparatus, such as telescopes, chemicals and electrical equipment.

Sixth, further use for these dues could be in advertising SCIENCE WONDER STORIES, which of course would be the official organ of the club.

Seventh, finally story contests, in which all would be eligible, could be held, the winners, as adjudged by SCIENCE WONDER STORIES board of editors, would be published in the magazine.

Well, thus endeth my weighty suggestions to everything most.

Frank K. Kelly,
Kansas City, Mo.

(We are sure that by the publication of this letter that it will come to the attention of Mr. Malaire. We are greatly interested in the Science Correspondence Club and wish to aid it in every way possible. We object, however, to Mr. Kelly's sixth suggestion, although we appreciate its import. We would feel that all dues of such a club should belong to the club and be used for its own expenses.—*Editor.*)

(*Continued on page 471*)

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The Reader Speaks

(Continued from page 670)

Editorial Disappointment

Editor, Science Wonder Stories:

Received my first copy a few days ago of SCIENCE WONDER STORIES, and I was highly pleased with it. I liked especially the wonderful stories "The Eternal Man," and "The Moon Beasts." They were both very scientific and of course very educational. I am exceptionally well pleased and I intend to continue buying your stories. I am also going to get a copy of your "Air Wonder Stories."

Frank Dannbacher,
Brooklyn, N. Y.

(The editors confess that they were a little disappointed that they did not receive more letters of praise for "The Eternal Man." The editors liked it immensely. It was short, to the point, intensely gripping, and was constructed perfectly. But we *maintain* our disappointment when we realize that it is one of those stories that must "sink in." And inevitably our readers are going to pick up that story again and reread it with ever-deepening appreciation.—*Editor.*)

Another For Dr. Keller

Editor, Science Wonder Stories:

I have just finished reading the September issue of SCIENCE WONDER STORIES and wish to give you my heartiest congratulations for future success. Each issue is better, in my opinion, than the preceding one. I am glad that you have decided to form the new department "Science Questions and Answers," and you will hear from me before long.

If the other two parts of "The Human Termites" are as good as the first part, then I, for one, believe it to be Dr. Keller's greatest work so far.

I picked "The Human Termites" (so far) as the best story in the September issue. "The Onslaught from Venus" came second, and "The Cubic City" third. The conclusion of "The Radium Pool" was great, being even better than the first part.

How about some more short stories? Give us some by Dr. Keller.

Extend my congratulations to Paul. He certainly is doing fine work.

Sidney Walters,
New York, N. Y.

(Mr. Eagles, who gave us a classification of stories in the September issue, is likely to be remembered for having started something of value to the readers, authors and editors. Following the publication of his letter we have been receiving a great number of similar comments, such as the above. The remarks on "The Human Termites" have been without exception fervent in their praise. We are glad for Dr Keller's sake. He has done a remarkable piece of work. One that is likely to be remembered long by science fiction readers.—*Editor.*)

On Atomic Energy

Editor, Science Wonder Stories:

Science fiction is rapidly becoming a vital part of our [illegible]. It stimulates imagination in a generation which, for the most part, sadly lacks it. Just recently I was discussing atomic energy with a friend of mine, a fellow chemist in a university. I was surprised when he maintained that atomic energy could never be of value because it would be necessary to expend as much energy to disintegrate the atom as could be obtained from it. He admitted, however, that the radium atom give up energy by spontaneous disintegration, but he lacked the necessary imagination to visualize an atom of a non radio-active substance supplying energy gratis.

I have been told that much of scientific fiction is too fantastic. I need only reply that the known wonders of this universe form a far more fantastic and wonderful story than ever emerged from the brain of an author. We need scientific fiction to present these wonders, mingled with the imaginative, in an attractive form. One can always gain scientific knowledge from science fiction, and knowledge gained by pleasure is not readily forgotten.

I would like to call your attention to two mistakes I noticed in the first issue of SCIENCE WONDER STORIES. In the "Warriors of Space" the author states that it takes 70 hours or about three days for light to travel from Saturn to the earth, whereas light actually transverses the distance in a little over an hour. The author also speaks of Saturn having eight moons. She has ten as at present known.

Howard James,
Crowley, Colo.

(The belief of the chemist mentioned by Mr. James has been recently stated by Robert Millikan, the distinguished physicist. Dr. Millikan believes that energy can be obtained only by "building up atoms." However, our knowledge on that subject is still admittedly sketchy. When we speak of the atoms we are dealing with a world whose laws are still imperfectly known to us, and anyone has a right to start with a scientific premise and build upon it logical deductions. This is just what science fiction writers are doing. And although many of them differ as to their conclusions the chances are great that one or more of them will have struck the truth long before that truth is verified experimentally.—*Editor.*)

Wants Spiritualistic Stories

Editor, Science Wonder Stories:

I am wondering why you couldn't give us something scientific on a much discussed question. I refer to the question of Spiritualism. Of course you call your magazine SCIENCE WONDER STORIES. Still, I would like very much to see you take the side of pure Science and give us something on the subject.

It isn't so long ago—as you will remember—that the *Scientific American* undertook the investigation of this subject, appointed a committee, etc. They investigated "Marjorie"—Mrs. Dr. Crandon of Boston, Mass.

Didn't prove or disprove anything. In fact, I think the committee disagreed in their findings.

Now we have the *Science and Invention* investigating, with their Mr Dunninger. By the way, I think he has acted rather unfairly.

Mr. Houdini was bitterly opposed toward spiritualism, but was willing to look at both sides of the question. He died a strong disbeliever.

Now Mrs. Houdini has come out in a little pamphlet—"The Houdini Messages"—in a strong statement admitting that she has received a message from Mr. Houdini. What are we coming to?

The churches fight it very bitterly. Claim it is "of the Devil." Spiritualists claim they have proved scientifically that we can get messages from the "dead." Science sits back on the sidelines and says nothing.

It would seem that as long as men like Lodge, Conan Doyle, and the rest of the big fellows are admitting the truth of the spiritualists' claim, it would pay science to pay a little attention.

I am very much interested in the question myself. Maybe it is not a question any more. The churches are still shunning it, which would look as though they were getting worried.

Now, Mr. Editor, you will please pardon me for bringing this matter up, but as I just told you, I am much interested. I think the churches are taking the narrow side of the question. Throwing dirt never will settle it.

W. B. Miethaus,
Petoskey, Mich.

(The editors frankly do not believe in Spiritualism (communication of the living with the dead and receiving messages from them) and until actual proofs are forthcoming, they must refrain from publishing stories in which the element of *spiritualism* is contained. The editors are open-minded about this entire subject of spiritualism and are willing to be shown, but all efforts to get any scientific demonstrations have always met with failure, so far. Even the medium who promises to do much, falls down entirely under any scientific demonstration, or what is more, he or she consciously or unconsciously practices fraud. The great trouble with practically all spiritualists is that they will not submit to any scientific investigation, and we believe that spiritualism must take its rank with Astrology, which compares with the rest.—*Editor.*)

(Continued on page 673)

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The Reader Speaks

(Continued from page 471)

"Human Termites" the Greatest Story

Editor, Science Wonder Stories:

The four issues of SCIENCE WONDER STORIES so far are wonderful.

A great feature is "The Problems of Space Flying." Please try to have a scientific fact or "near-fact" article in each issue.

I wonder why your readers and authors criticise the science in your stories! In "Warriors of Space" a thousand and one criticisms were published. Did any one ever pull Saturn into the Sun? Can anyone say with perfect proof that it would and disagreeably or that it would be impossible? No! The author has created an interesting idea that should be given credit because of the wonderful way in which he worked it out.

"The Alien Intelligence" was good but had a weak ending.

In closing I wish to say that "The Human Termites" promises to be the greatest story I ever read.

Charles Rush, Jr.,
New York, N. Y.

(Part of what Mr. Rush says about the "Warriors of Space" is true. Try as we may to calculate the effect of the new well-known space wars on the new well-known Saturn, there are still a great many incalculable factors that may turn the result in a good many unexpected directions. However, we want emphatically to encourage criticisms of all our stories. They are good not only for the writer of the letter, for it helps him to think critically, but it keeps the editors on their toes and convinces the author that he must stick to the logic or truthful if he wishes to escape a scolding from the readers. Altogether the state of free criticism is a very healthy one, and every reader who really has something to say, no matter how good or bad, has the freedom of our columns. "The Human Termites," in our opinion, is one of those rare, inspired pieces of writing that occasionally come before us. Dr. Keller must indeed have felt a great urge, a powerful, compelling force of a great message to have written as he did. In fact, as he said to us recently, "My feelings were so overpowering that I simply had to write it". From such feelings are the great works of art born.—Editor.)

On the "Brain of the Planet"

Editor, Science Wonder Stories:

My SCIENCE WONDER STORIES is reaching me nicely, and I am deriving a great deal of pleasure from reading it. I wish to thank you for your promptness in filling my order for the six books. The story by Lilith Lorraine, "The Brain of the Planet," I find of exceptional interest. While following the purpose of SCIENCE WONDER STORIES by describing the inventions of the future, like those of Wells, it attempts an actual solution of the ruling problem of the day, and shows a training in human psychology as the determining force back of mankind's inventions. May we hope for more stories of like nature. I truly believe that the most enlightened part of the public are hungry for something more than mere detailed descriptions of machinery. In the story "The Eternal Man" the author has also dipped below the surface. My most hearty congratulations to you in your wise choice of stories, may you continue to keep in touch with authors who are able to give the public such splendid food for thought.

Marguerite M. Ward,
Berkeley, Calif.

(We agree with this writer that psychology is becoming increasingly important as a means of solving the world's scientific problems. While that science has received several bad names from the public because of exploitation by quacks, still we will never be able to truly call ourselves civilized until we are able to understand our mental processes and truly master ourselves as much as we have mastered the material forces of nature. Miss Lorraine's story may truly be called a symbolic rendering of the idea of how we are to be made happy and wise. If we can have wisdom poured into our ears as her "Brain of the Planet" does, we will then recognize the wisdom and be enabled to live more surely and more happily.—Editor.)

(Continued on page 475)

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The Reader Speaks

(Continued from page 673)

In Praise of "The Reader Speaks"

Editor, Science Wonder Stories:

Though I am enclosing no money for a year's subscription to your new magazine, I have read it from cover to cover, and I here extend to you my congratulations for the fine magazine you edit. I was an active reader of your former magazine, and since you have started a new one of science fiction, I want to have every copy of it, beginning with the initial number. It started off with a fine set of stories, and I hope it continues to publish fine ones, and I am sure it will under your able direction.

I am happy that you have a department each month for the reader's view of the stories, as by this I can see what my fellow readers think of the stories. Personally, I like them every one. I may differ in the author's view of certain things, but as the saying goes, there are no two people alike, this is bound to occur. Also the diversity of the stories. By this I mean the stories on different subjects, as Mr. Cabiness' story of "Misty Isle"; Mr. Marshall's story of interplanetarian warfare; and Mr. Wells' story of "The Diamond Maker." I am especially interested in the astronomical stories, and always read them first. I hope you have many in the future. I can hardly wait until the 3rd of June for the next number, as I am very anxious to read Capt. Nourdung's articles on space flying. I have always believed space-flying was possible, and wondered why some one hasn't tried it before.

"The Reign of the Ray," by Irving Lester and Fletcher Pratt is an exceptionally fine story. I am anxiously awaiting the next installment. The other stories in this issue are also good.

Some readers have expressed the desire to have not your questionnaire on interest. *By all means do not!* Neither leave out the Science News of the Month, as this is a valuable department, and it has many items in it that couldn't be obtained without some extensive reading of dry science. I am interested in astronomy very much, and these notes I am very glad to get. The other branches of science taken up by them is also valuable, and I read them too.

I have read, as I told you before in this letter, the letters of the readers, and I am here going to remark some of the notions they have put forward. First: Mr. Middleton's letter. I heartily second his suggestions numbers 1, 2, 4, 5 and 6. This is practically all of his points, but I put special emphasis on suggestions 1, 4, and 5. I like to know when I start a continued story exactly how many installments it will run. I also don't like to see them run over three installments. I don't like to see the continued story that has a small installment in one number and the next very long, just for the privilege of leaving off at an exciting place. I don't think this makes many people buy the magazine, and it is irritating reading. Here is another second on reader Keaun's suggestion, on having about two pages, or even less, with sky map, and the other astronomical things he mentions. This would be very helpful to an amateur astronomer that hasn't been in the game very long, as is the case with me.

Here is a comment on Miss Reid's letter. I think an illustration on the cover from one of the stories, attracts attention, and helps the reader. I like her suggestion of not sacrificing story interest to scientific details. Some authors seem to take a delight in putting into their stories paragraphs of scientific detail. Her idea of blocking off the details in small type is excellent. If a reader had no wish to read cold facts, he could skip this part very easily.

I, too, am waiting for Mr. Repp's story to appear in Science Wonder Stories. I hope you print it.

I am supposed to have been commenting on the magazine, but here I have done nothing but criticize the letters. I hope the writers of them don't object. As I close, I again wish you many congratulations on your magazine, and hope it will ever grow in favor. Tell your artist Paul that I think he is very good to draw those different machines that he has never seen. If it wasn't for his pictures, a good deal of interest would be lost in the stories.

G. G. Graham,
Athens, Georgia.

(Continued on page 676)

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The Reader Speaks

(*Continued from page 475*)

(The editor is in accord with most of [redacted] suggestions put forth by Mr. Middleton in the June issue, and endorsed by Mr. Graham in this letter. Serials are always mentioned as such in the first issue [redacted] they run, and the number of issues they are continued is also noted clearly. The suggestion of Miss Reid to block off in small type, details that are excessively technical, is also being carefully considered. Needless to state we are indebted to readers, such as Mr. Graham, who take the trouble to [redacted] constructive suggestions.—*Editor*).

From a Music Teacher

To the Editor, Science Wonder Stories:

Congratulations on your newest baby, SCIENCE WONDER STORIES, for a tonic to quiet the nerves after a strenuous day. I heartily recommend SCIENCE WONDER STORIES, and if No. 1 is a sample of what to expect in the coming issues, then all I can say is: "Well done, all ye scribes and editors—and not forgetting the authors."

If the multitude would only realise the real good that is contained in these stories and others of a like nature, then I honestly believe you could not keep up to the demand for them though your presses would be working 24 hours a day. So again, I say, "Well done, and may the new arrival live to a ripe old age."

Prof. Albert B. Tondra,
Teacher of Music, Organist.
Yonkers, N. Y.

(Professor Tondra has hit the right note when he calls SCIENCE WONDER STORIES a tonic for the nerves. Coming from a teacher of music, these kind words make us feel justifiably proud.—*Editor*).

A Search for a Brick-Bat

Editor, Science Wonder Stories:

Having just finished the July number of SCIENCE WONDER STORIES, I am going to write you about it before my enthusiasm wanes. I'm going to take the stories as they appear in the magazine and give my unvalued opinion on them all.

First, "The Alien Intelligence." Being a friend of Jack Williamson, I suppose my opinion is likely to be prejudiced. But we shall see. If I am the only one to shout its praises from the rooftops, I am a very poor judge of science fiction. I enjoyed "The Moon Pool," but not half so much as the story in question. You actually feel the surge of color, the play of emotions, the flash of of adventure. I do not know as yet what the eventual explanation of the weird intelligences are, except from what Jack has told me. His masterful knack of keeping one in suspense does not even fail him in talking to his friends. His information has only piqued my imagination the more.

Second, "The Reign of the Ray." No story of the future that I have yet read has so vividly portrayed things as they actually would be as has this wonderful story. Its conclusion was even better than the first installment. If we can continue to get such material in your magazines, I can assure you of my continued patronage, even if others do hold my view.

Third, "The Boneless Horror." I have not enthused over Keller's stories in the past, but his present story branches out on a new path and leads to a real masterpiece. He has developed his idea superbly. I hope he keeps it up.

Fourth, "The Menace From Below." I have read many stories of the supposedly hollow center of the earth, but I find here a new idea. He has combined the fourth dimension story with the truly wonder type of story.

"The Problems of Space Flying" is a very good technical work and fitting to the quality of your magazine.

I suppose you will not print this letter because there is only praise in it. Well, I can't find anything to criticise; truly I can't. If you only print letters that contain brickbats, I fear you will have to discontinue your Readers' column.

Raymond A. Palmer,
Milwaukee, Wis.

(We admit we are somewhat disappointed, publicly, that Mr. Palmer's letter contained only praise. But after all, we are only human, and privately, we are quite gratified.—*Editor*).

The Reader Speaks

(Continued from page 976)

A Thought for Page Numbering

Editor, Science Wonder Stories:

"Science fiction is my hobby, and yet it is more than that. It is my hobby because for the past ten years, I have saved all magazines wherein I found science fiction tales." (This paragraph is copied from your $10 prize winner.)

And therein lies my tale of woe.

I still like to save these stories, but there are so many good ones that up to now I have been saving them all, with the result that pretty soon I'll have to pay storage space for them.

With the old stories, that were published for sport and in between, I would simply tear out the installments and put them together under one binding. I would like to do the same thing now, with the stories which I like the best. But unfortunately, you print your magazine in such a way that it is impossible to do that without spoiling another equally good story.

Therefore, I have the following suggestion to make and I hope that you will print this in "The Reader Speaks," so that other readers may pass upon it.

All stories should start on an odd numbered page, including illustrations and also including continued stories. The finish of the story should not be carried over to another part of the book, but should be printed in continuous form. Where a story or installment ends in the middle of a page, the balance of the space should be used for "Science News of the Month." Even a few ads placed at the end of a story would be good. Personally, if I wanted to advertise something, I would pay a higher rate for space at the end of a story, than for space among the other ads. The ad would surely be seen by every reader, whereas in another part of the book it would be missed.

Every magazine wants more subscribers. For instance, take one certain magazine that publishes every once in a while a science story, which they call "Different Stories." An ad placed at the end of that story could read like this: "If you liked this story, subscribe to SCIENCE WONDER STORIES." This ad might cost more than other ads, but it's worth the price. You would be surprised to know how many readers of other magazines never even heard of your magazine, and if they did hear of it, they don't know the type of story it contains.

I have noticed that several of your readers have asked for reprints of certain stories, which were published years ago. I have quite a few of those stories in my collection, among which is "The Blind Spot," and "Pulse of the Dog Star Peak," including all the sequels. I will be pleased to lend them to you if you should need them.

Jack Gordon,
Brooklyn, N. Y.

(The suggestion that Mr. Gordon makes for the page numbering of stories is, unfortunately, impossible of fulfillment. If, for example a story started on page 37 (in accordance with his suggestion for odd numbered pages at the beginning) and the story was 21 pages long it would end on page 57, so that the next one would have to start on page 58. Thus, Mr Gordon's two ideas of having the stories continuous and having only odd numbered pages are together impossible. We do, however, always start a story on an even-numbered page so that the illustration always appears facing and on the left of the first page of the story. We do not believe it to be fair to the majority of the readers, although it would be profitable to us, to intersperse advertisements with the stories. Regarding advertising in other magazines, we already do this and will continue to, increasingly as the magazine grows. The editor is very grateful for Mr. Gordon's kind offer of his stories and may take advantage of it.—*Editor*).

Astrology No Science

Editor, Science Wonder Stories:

I hope this subscription doesn't arrive too late for your offer. My friend came across difficulties that neither of us expected.

I want to compliment you on the fine magazine that you have put out. I like your idea of putting the pictures of the authors in. It certainly adds to one's interest in the story if nothing else. I still think, however, that you

(Continued on page 978)

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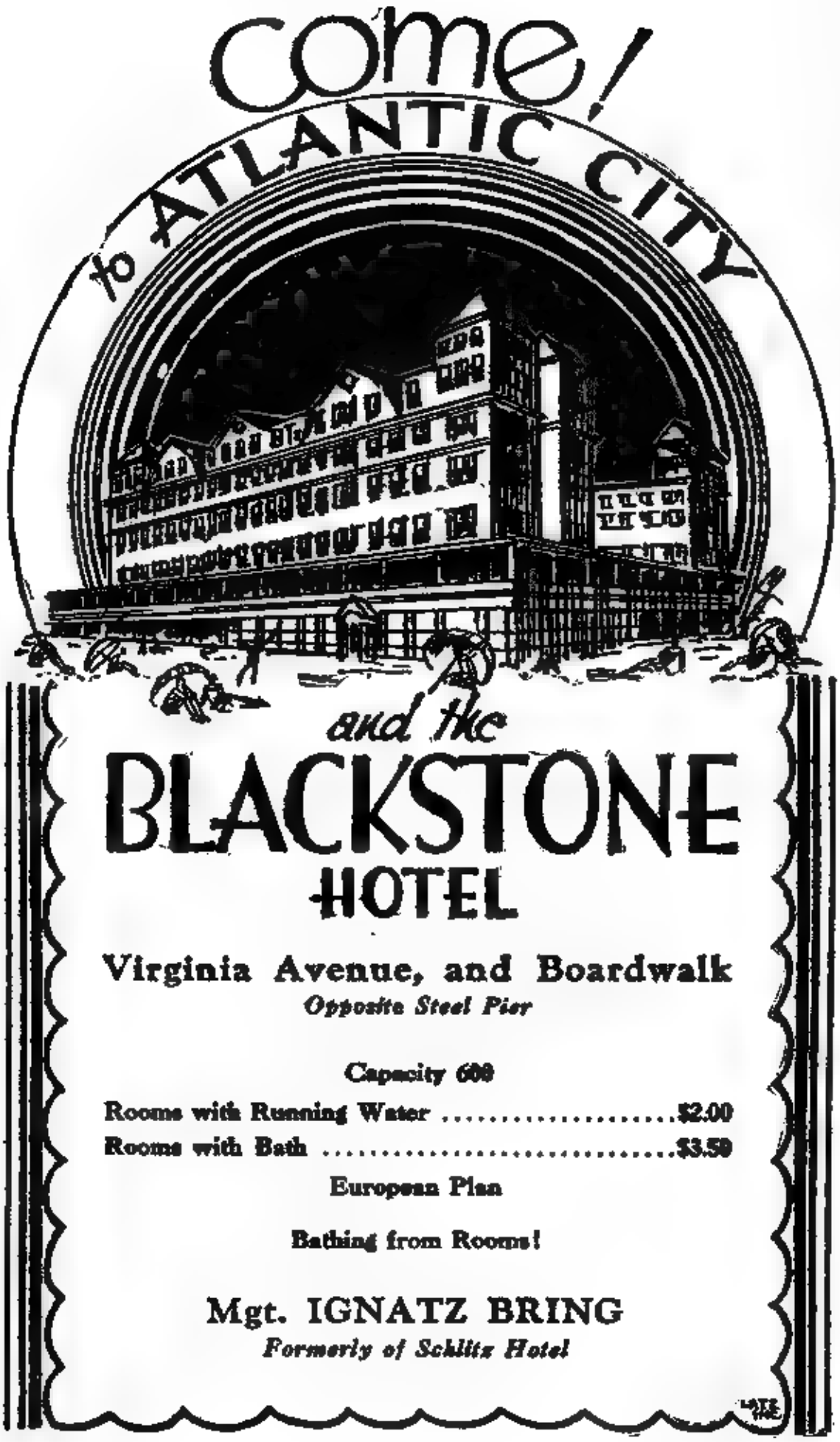


The Reader Speaks

(*Continued from page 477*)

could have one or two small pictures depicting the stories as well as the one big one at the beginning.

I am certainly glad that you put in the *Science News* department as it is going to *help me considerably with my school work.*

Enclosed you will find a newspaper clipping from last Sunday's Los Angeles *Times*. It mentions the fact that Professor Meyer is an astrologer. I believe in *Astronomy as a science*, but I think that "astrology" is "all wet." Also the item is from Hoboken, N. J., which is nearer to you than to me. Does this professor's statement mean anything? "Keep up the good work."

Wayne McAdam,
Pasadena, Cal.

(It is a matter of a great deal of gratification that the new "*Science News*" department helps this student considerably in his school work.

Regarding the clipping of "Professor" Gustav Meyer of Hoboken, in which he predicts many dire things for the world, this individual is very well-known to us and is a so-called astrologer, which pseudo-science of course, has nothing to do with Astronomy. It stands on a par with witchcraft. Astrology is denounced by all scientists.

Incidentally, their so-called predictions are most of the time incorrect and usually do not come true. Once in a while they make a lucky guess, and immediately their powers are broadcast to the world, but of all the failures that astrologers have, little or nothing is said.

Usually, the statements made by astrologists are so vague that they can be explained as most anything. As a matter of fact, any reader of this publication can predict future events with as good a chance of success as any astrologer. —*Editor*).

Wants Sequel to "The Marble Virgin"

Editor, Science Wonder Stories:

I've read your new magazine and find it very interesting, but what interested me most was the story "The Marble Virgin," by Kennie McDowd. Never had I enjoyed a story so much except the "Skylark of Space." I have one request to make. Will you try to make Mr. McDowd write a sequel to his story. I am a director of a theatre in New York and at a meeting of our group I read the story of McDowd's and it impressed them very much. So see if you can't persuade Mr. McDowd to write a sequel.

Sid Samuels,
New York, N. Y

(We are glad Mr. Samuel's group liked the "Marble Virgin" so well. We believe that in one respect at least it is a perfect science fiction story. And that is because the romance and science are so intertwined and evenly balanced that one could not exist if the other were omitted. We enjoyed the story very much as a story despite the criticisms that have been levelled against its scientific probability. We are going to see what we can do about a sequel.—*Editor*).

A Tribute to Dr. Keller

Editor, Science Wonder Stories:

I consider the contribution Dr. David H. Keller is making through his published writings are of the most valuable in that field, and I am delighted to testify, at his request, that I and my friends, have derived inestimable benefit from his works.

His understanding of the problems of human life classes him as a philosopher, psychologist and Christian gentleman with the training and authority of a scientist. No one who reads his articles and stories can fail to appreciate their clean and wholesome atmosphere, and feel that he has touched upon life's central truths with a deft and understanding hand.

John A. Merlin,
Cleveland, O.

(What Mr. Merlin says about Dr. Keller, We can heartily endorse. We believe Dr. Keller has a broad understanding and a broad, sympathetic humanity that permeates his writings. We are and always will be proud to have him as one of our authors.—*Editor*).

BOOK REVIEWS

POSSIBLE WORLDS by J. B. S. Haldane, 305 pages, stiff cloth covers, size 5¼x8. Published by Harper and Bros., New York. Price $2.50.

Haldane is one of the leaders in the group of scientists possessed not only of scientific skill but also of imagination. He doubtless has as much contempt for the hide-bound "professional" scientists as their enemies do. Blessed with a keen insight, with sympathy and tolerance he can look at the world, as indeed he does in "Possible Worlds" with a warm understanding.

The book is a fascinating collection of essays on all possible topics pertaining even remotely to science. Although they do not form a definite scheme, the essays are still related by a thin thread of the author's philosophies. As is evident however from the majority of essays, Haldane's chief field of interest is that of biochemistry, to him a science full of fascinating possibilities. Some of the titles will give an index as to the range of his thoughts. Enzymes; Vitamines; When I Am Dead; Darwinism Today; Possible Worlds; Man's Destiny; The Fight With Tuberculosis; On Being The Right Size are a few of the titles. The latter with its unpretentious title is one of the best. With his insight the author indicates how various animal types have been developed to sizes which naturally fit them. They cannot be smaller and should not be larger for survival. Such things as the size and weight of their internal organs, their weight per unit area of skin surface, are often things which determine their survival. He says for example that a mouse can be dropped down a thousand yard mine-shaft and "on arriving at the bottom gets a slight shock and walks away. A rat is killed, a man is broken and a horse splashes". The answer is found in the fact that a mouse's weight is small per unit of surface exposed to the air. Therefore its air resistance is relatively large. The same limitations are found in the size of birds. Thus, although an eagle is supposed to be a perfect example of a flying thing, yet it is not perfectly adapted. The eagle has so much weight in proportion to available muscle that it must depend on soaring in air currents to keep aloft. Man's weight in proportion to his muscles is so great that Haldane doubts any possibility of fitting him with wings. To any who wish scientific thought, written by one who has knowledge, insight and vision, this book is heartily recommended. It is written in popular style and hardly any scientific background is necessary to its understanding.

METHODS AND USES OF HYPNOSIS AND SELF-HYPNOSIS by Bernard Hollander, 191 pages, stiff cloth covers, size 4¾ x 7¼. Published by the MacMillan Company, New York. Price $2.00.

The word hypnotism, in most instances, summons up a picture of a solemnly spectacular gentleman making elaborate hand passes before the face of a passive subject for the edification of an audience mainly interested in being entertained. Very few people realize that hypnotism is coming to be regarded as an important part of medical therapeutics, especially in Europe. This book by Doctor Hollander, who has studied hypnotism all his life and has practiced it for thirty years, treats of this interesting subject, not from the point of view of the showman but from that of the physician and psychologist.

In the field of practical medical treatment, hypnotism is used to cure bodily and mental disorders. It is effective as a treatment for physical ills which have their root in a faulty mental state; and in the overcoming of certain mental and psychical weaknesses such as addiction to drink or drugs; loss of memory, perverse sexual habits, and general moral degeneration. In connection with these the author recounts some astonishingly spontaneous recoveries which have been effected by this method.

Hypnotism depends for its efficiency on the fact that the subconscious mind is very sensitive to suggestion. A patient in the state of hypnosis is in a condition of profound abstraction; all his faculties are concentrated on what the operator is suggesting to him and he does not stop to reason whether the suggestion is or is not logical—he absorbs it and acts on it.

Apart from the realm of directly practical treatment, interesting experiments are constantly being performed with hypnotized subjects and in connection with this, there are a number of chapters describing some surprising tests, in which the subjects have displayed sensibility to certain physical phenomena not at all distinguishable by people in the normal state. They have acquired highly acute senses; mental powers are heightened to an astonishing degree and latent talents have been greatly stimulated.

For those who are directly interested in definite methods of inducing the hypnotic state certain practices are described at length. This volume should prove of practical use and interest to all concerned with the new art of hypnotism.

THE COMING OF AGE IN SAMOA, by Margaret Mead. 285 pages, illustrated; size 9 x 5¾, stiff cloth covers. Published by William Morrow and Company, New York. Price $3.00.

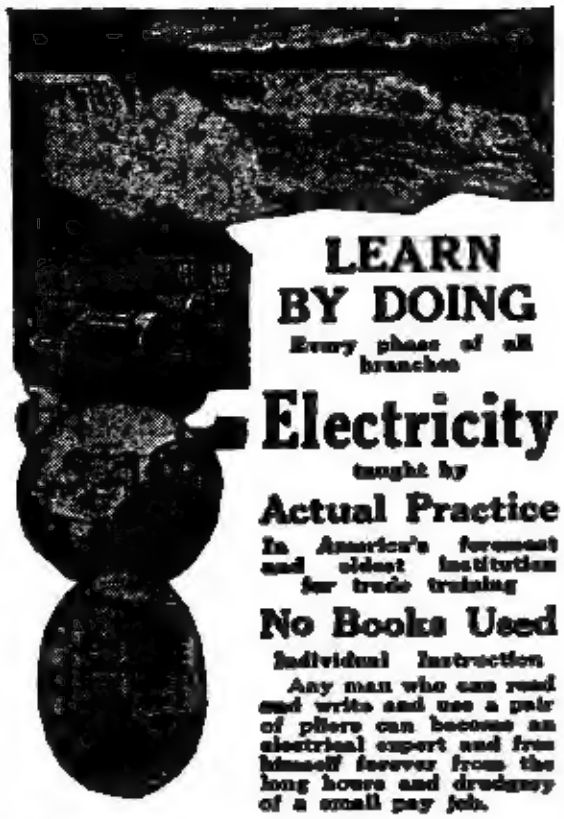
Margaret Mead, who is assistant curator of Ethnology at the American Museum of Natural History, calls her book a "Psychological Study of Primitive Youth for Western Civilization." Under that imposing title, she had essayed for herself the rather ambitious project of determining whether the problems that confront our adolescent youth, especially the sexual problems, are inherent in life in general or are the outgrowth of our customs and inhibitions. It is very natural then that she chose for her study the Samoan Islands where she believed she would find a people who live quite naturally and simply.

She has done her work well. She has studied her people by living with them and sharing their days and observing their manners. She has acquired the confidence of many of them so that they could tell her things that would not be apparent to even the best of observers.

Her conclusions are at best inconclusive. She struggles to escape the idea that living as simply as they do, that these Samoans still have burdened the problems of life with many forms and ceremonies. It is true that the pre-marital love making of the Islanders is not burdened with customs. And such love making is the rule rather than the exception. But when the time for the serious part of life draws near, and marriages are arranged then elaborate ceremonies surround every act.

The people she pictures are essentially children who look at life through gay childish eyes. Life to them is a game, a pretty game which must not be spoiled by taking it too seriously. It is possibly this game instinct which brings into being so many of their cute customs.

Although one cannot by any means say that the problem that Miss Mead set out to settle has been settled, one must admire her scientific spirit. For she points the way to similar studies, of other peoples. And what the book lacks in scientific insight it gains in charm of presentation. So it can be commended to those who want a book of description of a strange and lovable people, as well as to those who look for a serious sociological work.



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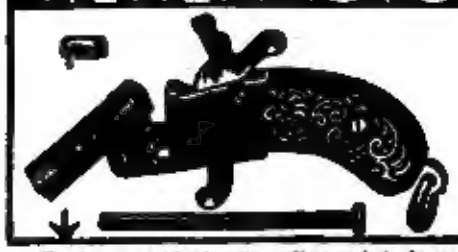

Here's a real pistol, yet small enough to be used as a watch charm. Illustration is full size. Imported, best European workmanship. Excellent reproduction of standard pistol. Cut shows pistol broken open to load blank cartridge. When trigger is pulled, cartridge goes off with a loud BANG, that can be heard for a block. Pistol entirely made of steel, nickel plated. Handle is beautifully engraved. Octagonal barrel. Comes in box, with cleaning rod and 25 blank cartridges, AT NO EXTRA CHARGE.
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No. 8517 Microscope
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No. 8518 Florscope
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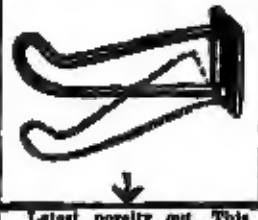
FOOLEM

Box of sponge rubber cigarettes. Can't be told apart when mixed with real ones. Get the laugh on your friends. Nothing like it. This is one of the cleverest novelties ever designed and is made exceedingly well. Even the ends of the cigarette look like real tobacco.

No. 8501 Cigarettes
Prepaid. Box 25c

HOAX HANGER



Latest novelty out. This trick coat-hanger looks just like the regulation article. But try and hang a coat on it and—FLOP down it comes. Hanger has a spring hinge—even a hat pulls it down. Hanger is fastened to wall with nails or screws. Nickel plated.

No. 8521 Hoax Hanger
Prepaid 25c

NO COMPASS!

Fine imported magnetic compass. ACCURATE. Pocket size. Invaluable for hikers, automobilists. Often saves lives. Use it to tell live electric wires; make your own galvanoscope. Fully nickel plated. The actual article is about one-half again as large as illustration shown.

No. 8507 Compass
Prepaid 10c

RUBBER!!

Cigar is made of sponge rubber. Fools everybody. Deception is perfect.

No. 8510 Rubber Cigar
Prepaid 10c.

Offer your friends or your girl some chewing gum—They try to chew it, till they find out its rubber! Five sticks to the packet.

No. 8519 Rubbergum
Prepaid 10c

BOOTLEG PUZZLE

A real stinker. Just try and get the bottle off the boot. It will take you quite a while till you master the intricacies of this clever puzzle. Made entirely of metal. Nickel plated. Size of this puzzle is 2½"x2½".

No. 8515 Bootleg
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TRICK-SOAP

Loads of fun with this trick soap. Looks harmless and is intended to "get" the chap who always uses your soap. When he uses it his hands get black as soot and he needs real soap to clean his hands.

No. 8512 Trick Soap
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No. 8508 Bluffgun
Prepaid 60c

PERISCOPE

See what's going on behind your back with this Seebacktoscope. Used like a magnifying glass. No one knows you're watching them. Gives you "eyes in your back." This article is made in molded bakelite and its size is 2"x1½".

No. 8509 Periscope
Prepaid 10c

CALLIOPE

Musical Calliope. Latest novelty. Made in celluloid, light weight. 6¼"x3". Eight keynotes produce perfect Calliope musical effect. Simple to play—just blow. Plays like Harmonica. Exceptionally loud. Finished in different, attractive colors.

No. 8521 Calliope
Prepaid 15c

NOSE BLOWER

The real article! Conceal nose blower in your handkerchief and blow into instrument, while you pretend to blow your nose. Everyone stops and looks at you. There never was a terrible noise like it. Keep it up as long as you like.

No. 8516 Noseblower
Prepaid 10c

DICE GAME

Real Dice game. Press lever on side. When released, dice spin around on green cloth. Smallest game of its kind. Built ruggedly. Same size as your watch. Full nickel finish. Glass crystal. Has a ring to attach to your watch chain.

No. 8514 Dice Game
Prepaid 45c

ROULETTE

Real roulette game. Press lever and arrow spins around. Never stops twice on same number in succession. Same size as your watch. Fully nickel plated, glass crystal. Loads of fun. Has a ring to attach to your watch chain.

No. 8513 Roulette
Game. Prepaid 45c

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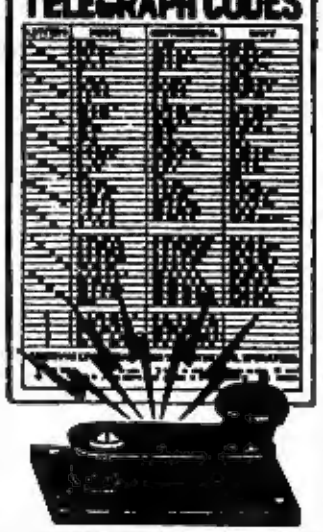

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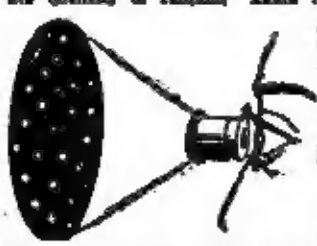

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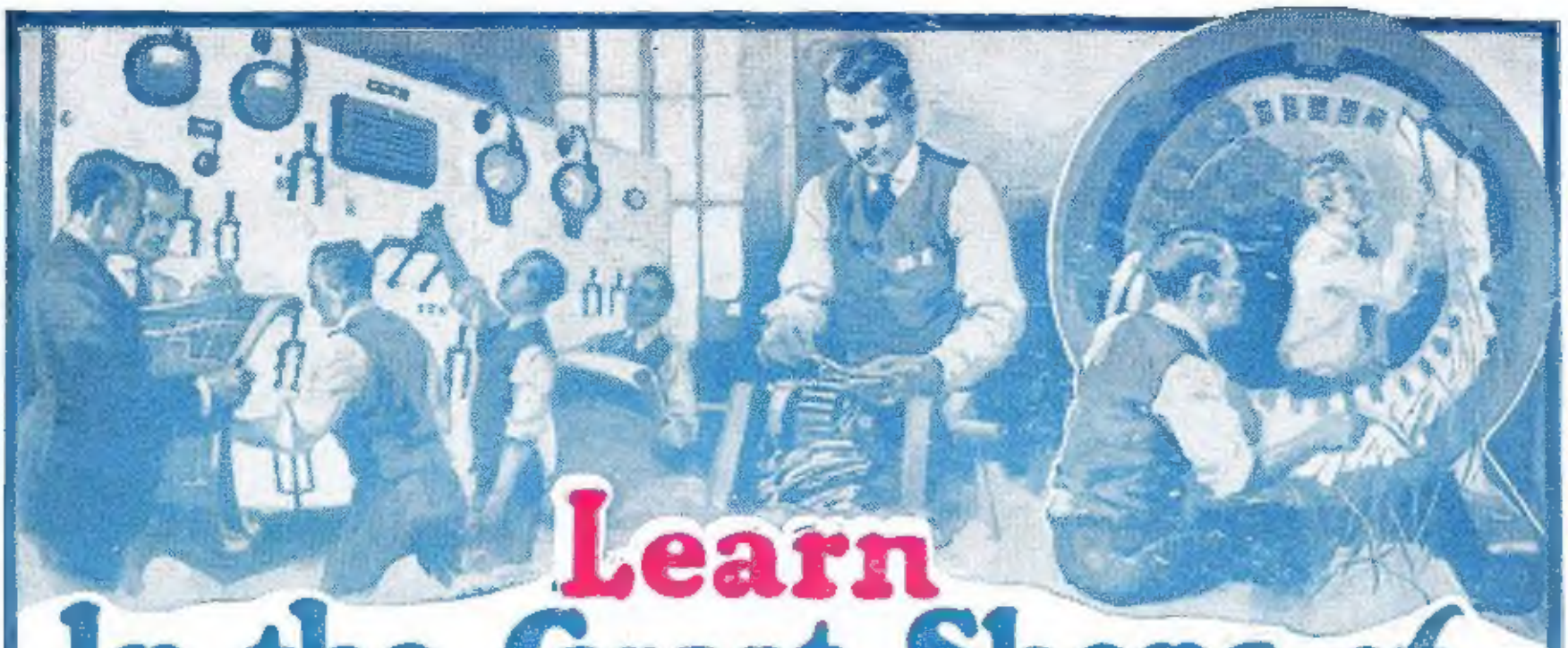

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